

Introduction

This curriculum guide outlines the major focus of the mathematics Programmes of Learning for students of Grades 7. It provides a set of teaching activities for each learning outcome as listed under each strand for each grade. The philosophical assumptions, rational and general aims of the curriculum are identified. Some suggestions relating to teaching, learning and assessment are also included.

Philosophy

The philosophical assumption underpinning this curriculum suggests that school mathematics needs to simultaneously educate all students about mathematics while equipping them with the skills necessary for them to be able to use their mathematical knowledge. The belief is that all students CAN LEARN both to acquire basic mathematics knowledge, skills and strategies; and to use such mathematical awareness as a tool for further learning.

The intent is to give students not only a body of mathematics facts and knowledge, but also a rich repertoire of skills, values and insights into mathematics. The curriculum therefore serves to assist all students in constructing their mathematical journey along which they will regularly use their mathematical experiences to make sense of the physical, cultural, social and environmental issues which impact on their lives.

In this way, this curriculum would achieve the intended goal of assisting all students to readily and consistently use their mathematical awareness to:

- acquire more mathematical knowledge
- enjoy and appreciate their mathematics learning
- better understand real life occurrences
- gain meaningful insights into other subject disciplines

Essentially, the philosophy guiding this curriculum suggests that the stated Programmes of Learning prepares students for adult life while facilitating for the enjoyment of mathematics learning. The implementation of this curriculum therefore requires learning environments that permit students to accept responsibility for their learning.

Rationale

If education is to realize the prescribed goal of producing adults who are capable of becoming problem solvers, then the mathematics education of all students must be emphasized. Indeed “the study of mathematics began because it was useful, continues because it is useful and is valuable to the world because of the usefulness of its results while the mathematicians who determine what the teachers shall do, hold that the subject should be studied for its own sake’ (Griffith & Howson, 1974).

Mathematics is a way of thinking. Mathematics stimulates the mind and interests curiosity. It promotes structured learning, logical thinking and sound reasoning. Mathematics is therefore considered as an activity; not a stock of knowledge. It is something the learners do – the vehicle through which knowledge is discovered in a meaningful way.

As an activity, mathematics challenges the learner to go beyond simply accepting information. It influences the mind to ask ‘how’, ‘why’ and ‘what if’, as justifications have to be given to support generalizations. The use of generalizations also allows for classifications of ideas, and the use of precise and concise language in describing patterns and relations. Mathematics therefore invites the learner to experience the world’s richness. It empowers the learners to ask his/ her own questions and to seek his/ her own answers; and then motivates him/ her to understand the world’s complexities. Mathematics provides for investigative learning, a process which allows the learner to construct his/ her own learning and thereby establish meaningful comprehension of the things which impact on him.

Mathematics education therefore promotes the acquisition of useful skills such as questioning, reflecting, hypothesizing, critical thinking and proof. The aesthetic value of mathematics and the fun enjoyed from mathematics related activities add much to the importance of the study of mathematics in any educational programme.

General Aims

This curriculum aims to produce students who are 'at home' with basic mathematics concepts, principles and strategies. To achieve this general aim, several broad goals covering the essential process skills to be developed and the content to be covered are suggested as key targets for all students.

Process

- To communicate ideas in precise but meaningful ways
- To utilize a variety of mental strategies when doing mathematics
- To develop and apply mathematical thinking and reasoning skills
- To adapt an analytical approach to learning of mathematical concepts
- To learn in ways which make for easy transfer of knowledge gained
- To regularly explore concepts in detail and systematic ways

Content

- To deepen understanding of mathematical concepts related to the five named strands
- To identify connections that exist across concepts, strands and topics
- To develop the skills of estimation, computation and calculation
- To gather, organize, present and analyze data in meaningful ways
- To study examples and non examples as related to a concept and use such information to formulate generalizations
- To construct and use formulae
- To develop spatial awareness and the skills of accurately measuring and recording
- To use algebraic thinking as a strategy in problem solving
- To identify properties of shapes

Problem Solving

- To use mathematical knowledge to identify causes and consequences
- To make informed choices based on analysis of data
- To use mathematics knowledge to investigate and solve routine and non-routine; theoretical and real life problems
- To enjoy problem solving as an fun activity

Information Technology

- To use the calculator effectively and efficiently as a tool to aid in computations and investigations
- To utilize technological devices to model data in different forms
- To use the internet as a medium for researching ideas relating to the study of mathematical ideas

Values and Attitude

- To experience the aesthetic value of mathematics
- To have fun while learning
- To develop theme approach to work
- To experience and value the social construction aspect of learning

Structure of the Curriculum

The curriculum outlines the content areas to be covered by students in grades 7, 8 and 9. The stated content areas are summarized into five strands. These include Number and Number Sense; Measurements; Geometry; Data Handling and Patterns and Algebra. An Attainment Target is identified for each named strand. Several Learning Outcomes with related Achievement Indicators are listed under each Attainment Target. The table below lists each strand with matching attainment target.

Strand	Attainment Target
Number & Number Sense	Students develop competency, knowledge, skills and understanding in mental and written computations as well as effective calculator use and numerical reasoning when working with numbers
Measurement	Students develop competency, knowledge, skills and understanding in identifying and communicating the attributes of shapes and objects; and employ measurement strategies to explore, investigate and solve theoretical and real life problems
Geometry	Students develop geometric knowledge, skills and understanding; and readily apply geometric reasoning to solve problems relating to spatial visualization
Data Handling	Students develop competency, knowledge, skills and understanding in collecting, organizing, representing, analyzing and evaluating information in order to make informed decisions, reasonable predictions, draw logical conclusions and solve problems
Patterns and Algebra	Students develop knowledge, skills and understanding in interpreting and constructing patterns, generalizations and graphical representations

Guiding Principles

The goal of this curriculum is to provide opportunities for students to learn about mathematics in ways that will equip them with knowledge and build their confidence in and attitude to the subject. Accordingly, it would be useful to adapt the following guiding principles in developing and implementing this unit.

Learning Activities

- As much and as far as possible learning activities should provide students with plenty of opportunities to construct understanding.
- Concepts should be developed in context using sufficient examples that embodied the concepts as well as non examples
- Students should be guided to deduce generalizations and formulae through structured exercises rather than giving formulae to students as rules
- Time should be allotted and learning activities organized for students to use their mathematical knowledge to investigate real life situations on a regular basis
- As much as possible students should be encouraged to develop the skill of estimating answers as a first step in their working towards solutions
- Small group activities should be used to encourage the development of interpersonal skills

Teachers will find it helpful to:

- develop an extensive knowledge of concepts, skills, processes and principles connected to the subject matters that they are expected to teach
- adopt classroom instructional practices that allow every child regardless of ability level to achieve some measure of success in every class
- plan every lesson on the basis of what students already know; what students need to know; and what students are able to do

Students will need to be given opportunities to:

- work mathematically by asking and using questions; constructing and solving problems; and reflecting and assessing their own learning
- participate in activities that help them to develop knowledge pertaining to the 'how' and 'why' of the concepts that they are exploring
- engage in activities that will challenge them to use their mathematics knowledge to explore new situations
- communicate their mathematics ideas in their own way and to be able to defend such thinking along mathematics lines
- connect their prior knowledge and experiences to new ideas and in the process develop a network of concepts, skills and processes related to the concepts under study
- share ideas and experiences by working in small groups
- reflect on their approach to learning and their progress in learning

Notes for the Teacher

Mathematics as a relevant tool is rendered meaningless when educators limit students to merely reproduce mathematical content. Additionally, mathematics as powerful as it is loses its effectiveness when educators rob students of opportunities to investigate phenomena and explore their environment. It is out of these two principled positions that the conviction has been reached that the mathematics teacher needs to adopt approaches that support the learner.

In using this curriculum, the emphasis should be on helping students to see their mathematics knowledge as a tool that they can use inside as well as outside the mathematics classroom. The focus of the curriculum is on teaching for understanding and learning for application. To realize these goals, students need to be regularly engaged in activities that guide them to discover mathematics relations for themselves in meaningful contexts. In essence, the teacher's responsibility is to create the learning climate that challenges students to learn how to learn. The teacher does this by encouraging self initiated inquiry, providing suitable materials and activities for learning tasks, and sensitively mediating teacher/ students; and student/ student interactions. This curriculum must therefore be guided by every teacher wanting to find time in every lesson to help students to:

- enjoy mathematics;
- understand its power;
- want to know more about it;
- feel confident about their ability to do mathematics

To achieve this goal, systematic planning is necessary at all times.

Planning for Teaching

Purposeful planning leads to insightful teaching approaches which provide clear learning pathways for students of all abilities. Much effort, time and resources need to be put into the planning for teaching. One useful approach to meaningful planning is for the teacher to conduct an analysis of each topic prior to teaching. This kind of planning brings gives clarity to the teacher about the major factors which might impede or support the learning process. The format given below provides a guide on how an analysis of a topic may be done.

Pre-requisites

As a first step in approaching the teaching of any concept/ topic, the teacher will find it useful to ensure that students have the necessary pre-requisite skills and knowledge rather than beginning to teach on the assumption that such are in place. It will be necessary in some instances for the teacher to devote some time prior to teaching a concept to assess the needs (readiness) of students. Where students are identified to be lacking in the necessary pre-requisites, it is advised that adequate activities be provided to facilitate students in acquiring the skills and knowledge that are needed to begin meaningful work in the particular area of study.

Development of concepts

Concepts need to be introduced and developed with students in practical ways. It is always important to facilitate for the emergence of mathematical ideas through students' engagement in a rich series of structured activities. Construction of understanding by students is therefore critical. This should never be replaced by the giving of definitions of concepts, formulae and a string of rules. This approach involves students' interactions with several examples that embodied the concept being introduced. Students' development of understanding of concepts also benefits when students' experiences are valued in the learning process.

It is important that the teacher remember, too, that it is not only the things that children can do that measures progress, but how they do them and whether their methods are of a kind that can be built on in subsequent development (Tall & FASTER 1996)

Establishing Connections

The hierarchical structure of mathematics itself necessitates that concepts be taught in a logical and sequential order. In teaching this curriculum, it is considered useful that focused effort be taken to identify and emphasize connections:

- between concepts and topics within mathematics itself
- with other subject disciplines
- across grade levels

In this regard, an approach to learning mathematics that helps students to see mathematical concepts not as isolated bits of information, but as ideas that are interrelated needs to be emphasized. This makes learning more meaningful, as it allows for students to actively involve in constructing a network of concepts and skills. In this way, students are able to make sense of the knowledge so gained as they would have proven it to be true and can also explain why it is so. According to Selinger (1994) if mathematics is to have any meaning then inter-woven with the learning of skills there must be recognition about how such skills are connected.

Application of Knowledge

This curriculum lends itself to much investigative work. Students can therefore be given several open ended tasks in which they are encouraged to explore mathematical ideas as they relate to issues within students' experiences. Such investigative tasks may form part of regular class activities or home work tasks and may be done as whole class, small groups and individual assignments. Ideally, the choice of activities will be based on the environmental and social issues prevailing in the immediate environments of students.

Vocabulary

Language plays a significant role in any programme of learning. Mathematics is no exception. Some words carry a different meaning within a mathematical context than their usual meaning. Other words used in mathematics are peculiar to mathematics. This situation adds to the challenges encountered by the student of mathematics

Many students find mathematics difficult because they do not understand the words being used. Some words are peculiar to mathematics and are used only in the context of mathematics (ROSE1 Curriculum 1998).

Based on this understanding, it seems necessary that the teaching of any mathematics curriculum will require some focus on the mathematics vocabulary that is related to the aspect of mathematics that is being studied. The provision of opportunities for students to build and extend their mathematics vocabulary is therefore central to this programme of learning. In this regard, students' mathematics learning seems likely to benefit where mathematics language emerges out of appropriate contexts; and students are encouraged to keep track of the development of their own mathematical vocabulary.

Assessment

The philosophical underpinning and the proposed approach to teaching governing this curriculum necessitates a type of assessment procedure that emphasizes a shift from the usual paper and pencil tests to a more encompassing assessment structure. Assessment should aim primarily at enhancing students' learning by providing useful information to the teacher and students. Research suggests that students learning benefits when assessment is intricately linked to instruction. Teachers may achieve this goal by integrating assessment with their teaching instruction rather than approach assessment as an entity that is seen as interrupting instructions and or tagged on at the end of each unit of work.

One useful strategy is for the teacher to encourage students to frequently ask questions and to respond to students' questions with questions, as a means of challenging students to make their own interpretation of ideas. This approach to assessment provides the additional advantage of allowing the teacher a window into the minds of the learner. This has a further benefit of enabling the teacher to readily detect students' mistakes thereby providing for the teacher to work along with students to determine corrective measures on an ongoing basis.

Assessment may be further broadened to include oral presentations, project work, reflective writing, port folio and performance on authentic tasks. The idea of using a wide range of assessment tasks is to allow students to demonstrate their learning in different ways. Additionally, engaging students in investigative work provides useful opportunities for direct assessment of students' ability to apply their knowledge to novel situations.

Writing as a tool for assessment may be incorporated as a systematic way of assessing students' understanding, while encouraging students to communicate mathematical ideas. This can be done to encourage self-assessment of mathematical learning by students while allowing the teacher to get a sense of how students see themselves in learning a particular concept.

Essentially, assessment of students' learning associated with this curriculum should as much as possible provide useful information on students':

- development of mathematical insights
- mental attitude to mathematics and the particular strand, topic and concept being studied
- creativity and problem solving abilities
- reflective approach to learning
- perceptions of their teacher's approach and attitude to teaching

When assessment encompasses these different aspects, assessment would determine students' progress rather than just provide the teacher with a grade to be assigned to students.

Questioning

Accepting the commonly held view that effective teacher stimulates learning demands the adoption of a rich repertoire of effective strategies capable of provoking and cultivating productive thoughts by students. A deliberate move to create a shift in teaching to reflect the inclusion of provisions for increasingly more mental challenges is considered most relevant. In this regard, the use of good questioning skills seems an immediate priority as the teacher will of necessity need to tell students less while asking students to tell him/ her more.

This means that the teacher has to consciously find ways of providing students with plenty of opportunities for them to communicate using the mathematical ideas they are learning. It is for this reason that questioning is considered an important teaching strategy. A questioning strategy supports the learning process by serving as a necessary tool for guiding students to classify misunderstandings. The preference for suggesting questioning over teacher talk is embedded in the fact that the questioning style lesson tends to promote:

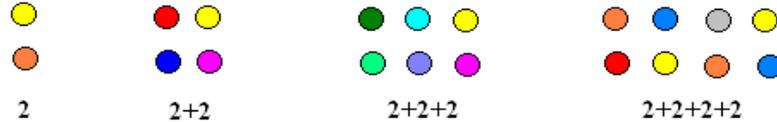
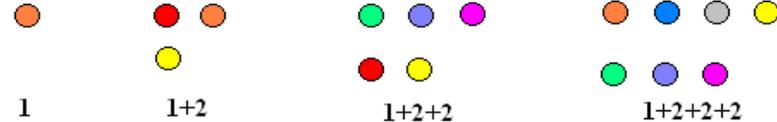
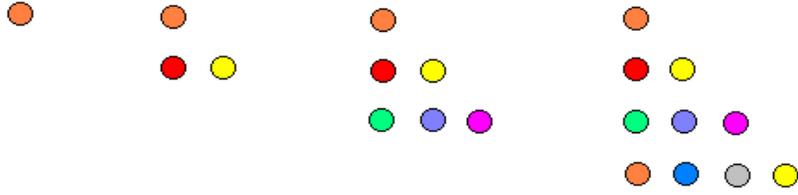
- students' thinking over regurgitation of knowledge
- the building of understanding over knowing
- stimulation of curiosity over memorization
- divergent thinking over convergent thinking

The motive therefore for asking questions is to stimulate and challenge the intellectual ability of students. In the words of Petty (1992) questioning teaches students to think for themselves.

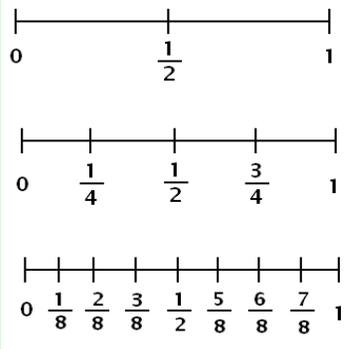
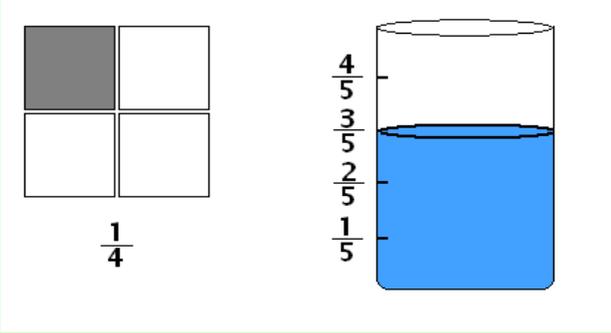
SUGGESTED TEACHING, LEARNING AND ASSESSMENT ACTIVITIES

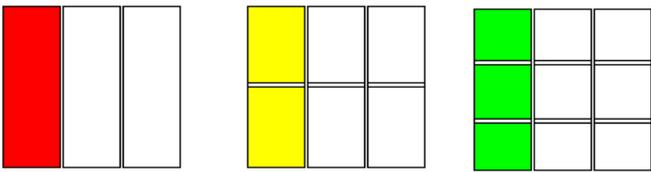
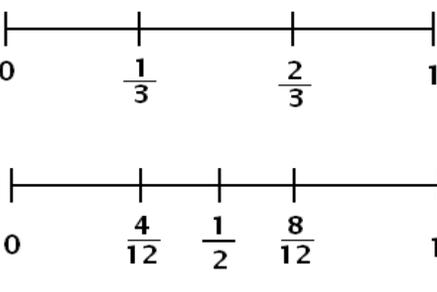
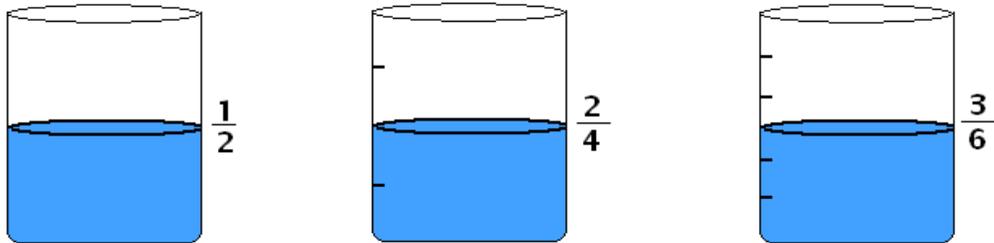
Learning Outcomes										
<p>LO:1</p> <p>Demonstrate an understanding of place value by reading, writing and ordering, whole numbers of any size; and using related vocabulary</p>	Suggested Learning Activities (NUMBER & NUMBER SENSE)	Assessment								
	<ul style="list-style-type: none"> • Use pictorial representations/ Illustrations to compare the relative size of numbers; For example: <ul style="list-style-type: none"> - place value charts - number lines - bar charts • Use large numbers in real life situations. For example create a list of things that can be bought for: <ul style="list-style-type: none"> - one hundred thousand dollars - one million dollars • Speak of the size of one number in relation to another number. For example: <ul style="list-style-type: none"> - 999 is very close to one thousand or one less than one thousand - 1 000 025 is a little more than one million • Convert numbers in base ten to base 2 and base 5. For example: <ul style="list-style-type: none"> - $22 = 4 \times 5 + 2 \times 1$ $= 42_5$ - $41 = 1 \times 25 + 3 \times 5 + 1 \times 1$ $= 131_5$ • Write base two and base five numbers in expanded notations. For example: <ul style="list-style-type: none"> - $1012 = 1 \times 22 + 0 \times 21 + 1 \times 20$ - $235 = 2 \times 51 + 3 \times 50$ 	<ul style="list-style-type: none"> • Students complete worksheet involving: <ul style="list-style-type: none"> - Identification of the value of digits in numbers. - Write words for numbers and numbers for words. • Students write numbers in expanded notation. • Students convert numbers of one base to another: • Students collect samples of large numbers from printed material. • Project work for example: <ul style="list-style-type: none"> - Have students design their own number system. 								
<p>LO:2</p> <p>Use the vocabulary of estimation and approximation; make and justify estimates and approximations of numbers</p>	<ul style="list-style-type: none"> • Make estimates about real life situations and explain how you worked out each estimate orally or in writing. For example, estimate the number of: <ul style="list-style-type: none"> - footsteps that will cover a given distance; - glasses of water a person will drink in a year, a decade, lifetime, century; - words/ letters are written on page; - banana plants that can be planted in the schoolyard/ playing field; - the amount of money spent during a week/ month/ year by students of your class • Speak of the appropriateness of different estimates used in relation to a given computation. For example speak of the usefulness of the noted estimations for the given computations: <table border="1" data-bbox="611 1258 1251 1393" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="text-align: center;">Computation</th> <th style="text-align: center;">Estimation</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">999×49</td> <td style="text-align: center;">$1,000 \times 49$; $1\ 000 \times 50$</td> </tr> <tr> <td style="text-align: center;">$7,564 \div 25$</td> <td style="text-align: center;">$7,550 \div 25$; $7\ 600 \div 25$</td> </tr> <tr> <td style="text-align: center;">$89.9 \div 14.9$</td> <td style="text-align: center;">$80 \div 15$</td> </tr> </tbody> </table>	Computation	Estimation	999×49	$1,000 \times 49$; $1\ 000 \times 50$	$7,564 \div 25$	$7,550 \div 25$; $7\ 600 \div 25$	$89.9 \div 14.9$	$80 \div 15$	<ul style="list-style-type: none"> • Students estimate results of computations and write short notes to explain strategies used in arriving at estimations
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999×49	$1,000 \times 49$; $1\ 000 \times 50$									
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Learning Outcomes		
	Suggested Learning Activities (NUMBER & NUMBER SENSE)	Assessment
<p style="text-align: center;">LO:3</p> <p>Understand, select and apply appropriate strategies for the four basic operations; and develop ways to check accuracy of computations</p>	<ul style="list-style-type: none"> • Add mentally, by looking for pairs that make multiples of 10, 100, 1000 and doing these first. For example: <ul style="list-style-type: none"> - $36 + 19 + 24$ $36 + 24 + 19$ $60 + 19 = 79$ - $31 + \square + 29 = 87$ $\square + 31 + 29 = 87$ $\square = 87 - 60 = 27$ • Employ different strategies in working out solutions to computations. For example by: <ul style="list-style-type: none"> (i) counting up from the smaller to larger number <ul style="list-style-type: none"> - $800 - 285$ is $5 + 10 + 500 = 515$ (285 plus 5 gives 290 plus 10 gives 300 plus 500 gives 800. I have added a total of 515 to 285 to get 800. my answer is 515) (ii) adding mentally three or more multiples of 10. For example: $80 + 70 + 40 + 90$ (iii) recognizing situations that give rise to an alternate (shorten) form of calculation. For example recognizing that $70 + 71 + 75 + 77$ is equivalent to $(70 \times 4) + (1 + 5 + 7)$ • Use the calculator to produce Identify patterns that emerge when multiplying whole numbers by 10 and multiples of 10; and 100 and multiples of 100 • Discuss/ illustrate the interpretation of computations involving mixed operations and the consequences of the order in which the operations are carried out. For example: <ul style="list-style-type: none"> - $25 + 6 \times 4$ (twenty five added to the results of six times four, hence I need to find the result of six times four so that I can add twenty five to it) - $15 - 24 \div 4$ (In this item, I am required to take away the result of twenty four divided by four from fifteen. I therefore need to divide before I take away) • Deduce from practical activities rules relating to the order of arithmetic operations. For example, 	<ul style="list-style-type: none"> • Complete exercises involving computations with the four basic operations • Give oral or written statements describing appropriate situations that match a work computation. For example: $3741 + 2675$ may be written as: Mr. Brown bought a computer for \$3741 and a stove for \$2675. Mr. Brown's total bill was \$6416. • Give oral/written explanation to outline the mental strategies employed in performing computation involving the four operations. • Design a game/puzzle based on computations based on the four operations.

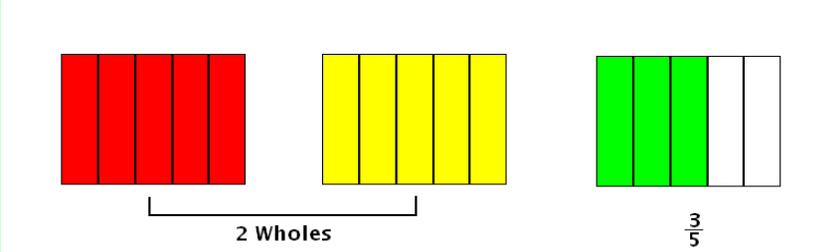
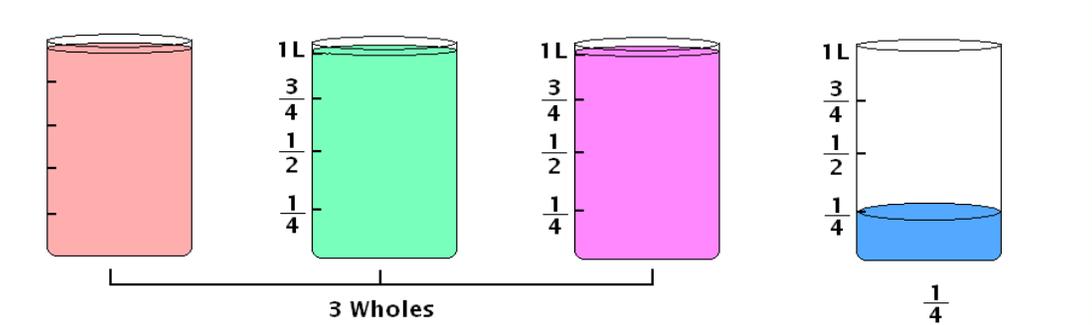
Learning Outcomes	Suggested Learning Activities (NUMBER & NUMBER SENSE)	Assessment																									
<p style="text-align: center;">LO:4</p> <p>Distinguish between; order; and calculate with different types of numbers</p>	<ul style="list-style-type: none"> Generate different types of numbers by placing objects such as counter and crown corks into different arrangements and speak of the geometric shapes formed by the arrangement. For example <div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;">  <p>2 2+2 2+2+2 2+2+2+2</p> <p>Each new term is two more than the previous</p> </div> <div style="text-align: center;">  <p>1 1+2 1+2+2 1+2+2+2</p> <p>When these numbers are grouped into two's, there is one counter without a partner</p> </div> <div style="text-align: center;">  <p>1 1+3 1+3+5</p> <p>The number of counters in each term is arrayed in a square formation</p> </div> <div style="text-align: center;">  <p>1 1+2 1+2+3 1+2+3+4</p> <p>The numbers of counters in each term is arranged in a triangular formation, add two, add three, add four</p> </div> </div>	<ul style="list-style-type: none"> Solve puzzles such as: Find: (a) Two numbers that give a sum of 100 (b) Three numbers that give a sum of 100 (c) Four numbers that give a sum of 100 <table border="1" style="margin: 10px auto; text-align: center;"> <tbody> <tr><td>75</td><td>37</td><td>10</td><td>88</td><td>01</td></tr> <tr><td>13</td><td>35</td><td>27</td><td>05</td><td>25</td></tr> <tr><td>50</td><td>63</td><td>29</td><td>99</td><td>40</td></tr> <tr><td>11</td><td>14</td><td>15</td><td>30</td><td>42</td></tr> <tr><td>12</td><td>20</td><td>43</td><td>58</td><td>60</td></tr> </tbody> </table> <ul style="list-style-type: none"> Classify whole numbers according to type (Odd, Even, Composite, Square, Triangle, Prime). Design a chart to highlight example of one or more numbers Arrange counters into patterns and describe orally or in short notes the role governing the arrangement of the counters. 	75	37	10	88	01	13	35	27	05	25	50	63	29	99	40	11	14	15	30	42	12	20	43	58	60
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Learning Outcomes	Suggested Learning Activities (NUMBER & NUMBER SENSE)	Assessment
	<ul style="list-style-type: none"> • Describe each formation in terms of <ul style="list-style-type: none"> - its geometric shape; - and how successive pattern in the set is constructed; • Investigate the results of performing the four basic operations on different types of number and make comments about the result in relation to the types of numbers used. For example, <ul style="list-style-type: none"> - the product of two odd numbers is odd; - the sum of two even number is even; - the sum of an even and an odd number is odd; - the sum of two odd numbers is even; - the product of two even numbers is even • Determine the common multiple and the lowest common multiple of sets of numbers by: <ul style="list-style-type: none"> - using time tables; - counting sets of the given numbers - listing multiples • Determine common factors and highest common factor of a set of numbers by: <ul style="list-style-type: none"> - Using time tables to determine all the numbers that can divide each given number - Trial and error (stating a number and testing it to see if it can divide the given numbers) 	

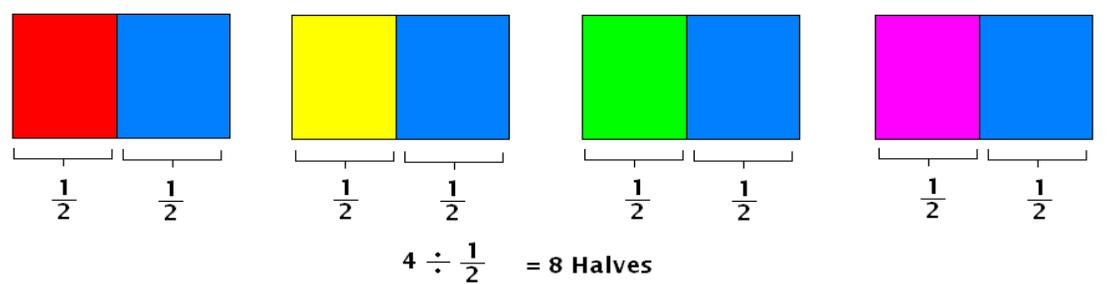
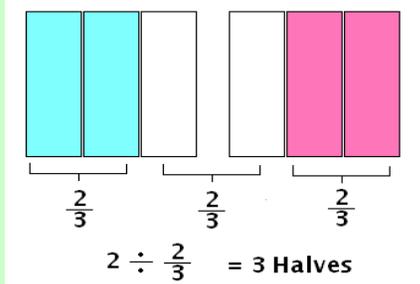
Learning Outcomes	Suggested Learning Activities (NUMBER & NUMBER SENSE)		Assessment
<p style="text-align: center;">LO:5</p> <p>Model, compare and represent fractions, decimals and percentages</p>	<p>Fractions</p> <ul style="list-style-type: none"> • Model fractions as part-whole. For example: <ul style="list-style-type: none"> - shade $\frac{2}{5}$ of this shape. - Shade $\frac{1}{2}$ of this shape in as many ways as possible. • Model fractions as a part of a linear measurement. For example: <div style="text-align: center;">  </div> • Model fractions as a part of the volume/capacity of a solid shape. For example: . <div style="text-align: center;">  </div> 		<ul style="list-style-type: none"> • Complete worksheets in which students illustrate fractions as: <ul style="list-style-type: none"> - Part of a whole (Area measurement) - Part of a linear measurement • Complete written exercises in which students: <ul style="list-style-type: none"> - Generate sets of equivalent fractions - Convert from mixed numbers to improper fractions and vice versa

Learning Outcomes	Suggested Learning Activities (NUMBER & NUMBER SENSE)	Assessment
	<p data-bbox="411 282 1129 310">• Use diagrams to illustrate equivalent fractions. For example:</p> <div data-bbox="625 347 1297 618" style="text-align: center;">  <p data-bbox="709 548 741 602">$\frac{1}{3}$</p> <p data-bbox="951 548 982 602">$\frac{2}{6}$</p> <p data-bbox="1182 548 1213 602">$\frac{3}{9}$</p> </div> <div data-bbox="722 646 1201 964" style="text-align: center;">  </div> <div data-bbox="453 987 1493 1279" style="text-align: center;">  <p data-bbox="688 1110 720 1164">$\frac{1}{2}$</p> <p data-bbox="1056 1110 1087 1164">$\frac{2}{4}$</p> <p data-bbox="1434 1110 1465 1164">$\frac{3}{6}$</p> </div> <p data-bbox="411 1333 1451 1360">• Translate verbal statements containing fractional quantities into symbolic representation</p>	

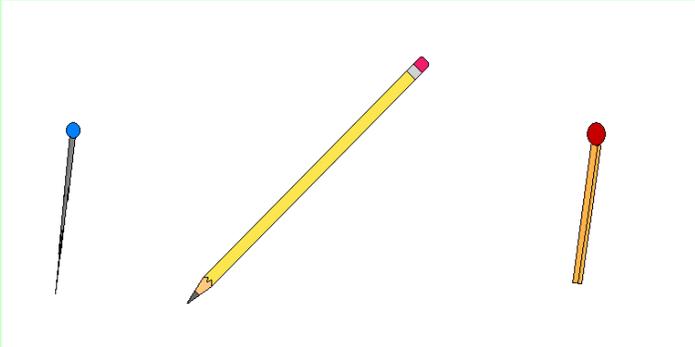
Learning Outcomes	Suggested Learning Activities (NUMBER & NUMBER SENSE)	Assessment
	<ul style="list-style-type: none"> • Convert improper fractions to mixed numbers and vice versa. For example <ul style="list-style-type: none"> - change $\frac{24}{5}$ to mixed numbers - change $4\frac{7}{10}$ to improper fraction - reduce to lowest terms $\frac{14}{21}$, $\frac{35}{25}$, $\frac{21}{32}$ • Recognize from practical work relationships between fractions, for example: <ul style="list-style-type: none"> - One half ($\frac{1}{2}$) is twice as much as one quarter ($\frac{1}{4}$) - One tenth ($\frac{1}{10}$) is ten times as much as one hundredth ($\frac{1}{100}$) - Three thirds ($\frac{3}{3}$) is equivalent to one whole • Make use of the decimal point in recording measurements of length, mass, money, time. For example: <ul style="list-style-type: none"> - 80 cm = 0.8m - 2500g = 2.5kg - 50 cents = \$0.50 • Interpret calculator display of decimals in context of the problems. For example: <ul style="list-style-type: none"> - 12.3 may mean \$12.30 in a problem involving money calculations; - 12 metres 30 centimetres in a problem involving measurement of length - 12 hours 18 minutes involving measurement of time • Use calculator to create patterns involving decimal numbers. For example: <ul style="list-style-type: none"> - $1 \div 10$; $2 \div 10$; $3 \div 10$; $4 \div 10$ - $1 \div 100$; $2 \div 100$; $3 \div 100$; $4 \div 100$ • Read and write one decimal place as tenths and two decimal places as hundredths. For example: <ul style="list-style-type: none"> - 0.4 as zero point four- four tenth - 0.15 as zero point one five – fifteen one hundredths • Read, write and interpret percentages as one hundredths. For example: <ul style="list-style-type: none"> - 1 % is read as one hundredth and written as 0.01 or $\frac{1}{100}$ - 20 % is read as twenty – one hundredths and written as 0.20 and $\frac{20}{100}$ • Convert between fraction, decimal and percentage 	

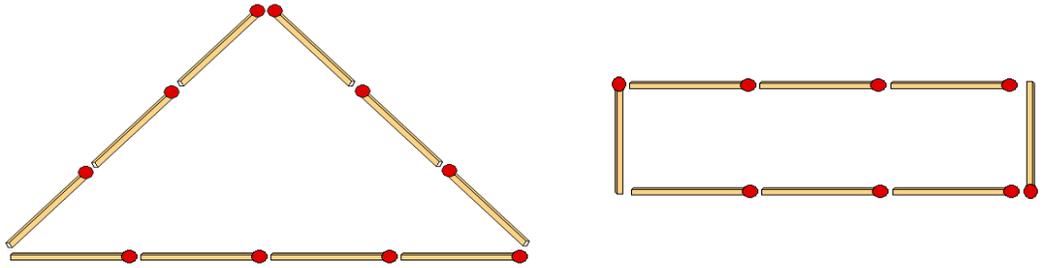
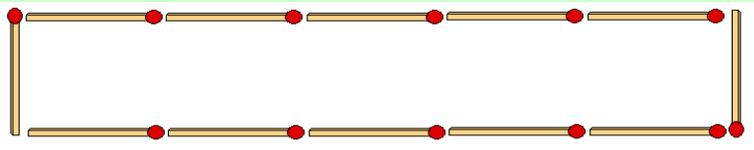
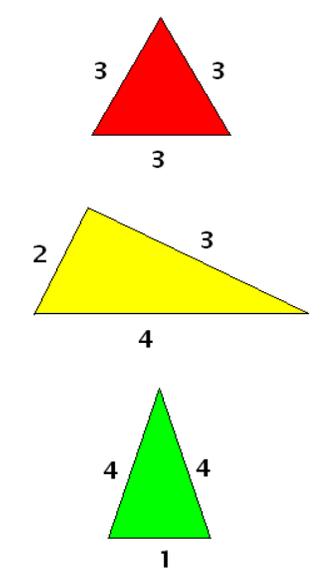
Learning Outcomes	Suggested Learning Activities (NUMBER & NUMBER SENSE)	Assessment
<p>LO:6</p> <p>Compare, order and calculate with decimals, fractions and percentages</p>	<p>• Convert improper fractions to mixed numbers and vice versa by: - using pictorial representations to illustrate mixed numbers. For example $2\frac{3}{5} = \frac{13}{5}$ may be shown as</p> <div style="text-align: center;">  <p>2 Wholes $\frac{3}{5}$</p> </div> <div style="text-align: center;">  <p>3 Wholes $\frac{1}{4}$</p> </div> <p>- expanding the given fraction. For example:</p> $\frac{7}{3} \equiv \frac{3}{3} + \frac{3}{3} + \frac{1}{3} = 2\frac{1}{3}$ $\frac{12}{7} \equiv \frac{7}{7} + \frac{5}{7} = 1\frac{5}{7}$ <p>• Use diagrams to illustrate addition and subtraction of fraction. For example:</p> <p>- (Draw three rectangles shade as follows (3/6 + 2/6 (a) 3/6 (b) 2/6 (c) 5/6; ii five rectangles shade as follows 1/3 + 2/5 (a) 1/3 (b) 2/5 (c) 3/15 (d)6/15 (c) 11/15 iii three rectangles 2/5 – 1/3 (a) 2/5 (b) 6/15 (c) 1/15)</p>	<p>• Perform computations to show the equivalences between fractions, decimals and percentages</p> <p>• Solve problems involving computations with fractions, decimals and percentages.</p> <p>• design a chart to show equivalence between fractions, decimals and percentages.</p> <p>• Write short notes to explain the process of:</p> <ul style="list-style-type: none"> - Adding or subtracting fractions with unlike denominators - Multiplying a fraction by a fraction - Dividing a whole number by a fraction

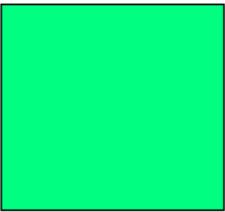
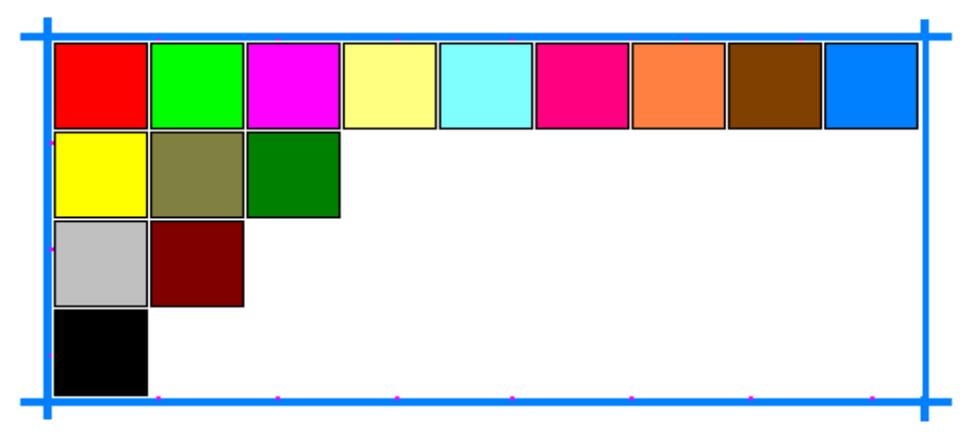
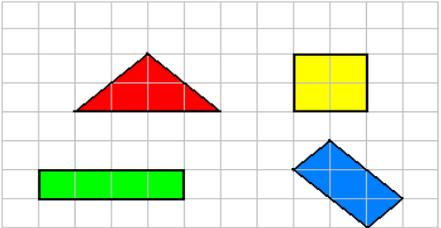
Learning Outcomes	Suggested Learning Activities (NUMBER & NUMBER SENSE)	Assessment
	<ul style="list-style-type: none"> • Calculate percentage, decimal and fraction of the same quantity and compare and discuss the results obtained. For example: <ul style="list-style-type: none"> - 20% of 400; 0.2 of 400; $\frac{1}{5}$ of 400 all give the same result therefore $20\% \equiv 0.2 \equiv \frac{1}{5}$ - 10% of \$50; 0.01 of \$50; $\frac{1}{10}$ of \$50 (10% and $\frac{1}{10}$ gives the same result of \$5, but 0.01 gives a result of \$0.50 therefore 0.01 is not equivalent to 10% or $\frac{1}{10}$) • Use the calculator to generate patterns that reflects the results of a decimal number multiplied by 1, 10, 100, 1000. For example: <ul style="list-style-type: none"> - $0.5 \times 1 = 0.5$; $0.5 \times 10 = 5$; $0.5 \times 100 = 50$; $0.5 \times 1\ 000 = 500$ - $2.3 \times 1 = 2.3$; $2.3 \times 10 = 23$; $2.3 \times 100 = 230$; • Use the calculator to generate patterns that reflects the results of a decimal number multiplied by 1, 10, 100, 1000. For example: <ul style="list-style-type: none"> - $0.5 \times 1 = 0.5$; $0.5 \times 10 = 5$; $0.5 \times 100 = 50$; $0.5 \times 1\ 000 = 500$ - $2.3 \times 1 = 2.3$; $2.3 \times 10 = 23$; $2.3 \times 100 = 230$; $2.3 \times 1000 = 2\ 300$ • Explore different strategies in computing a fraction of a whole number. For example: $\frac{1}{5} \text{ of } 15 = \frac{15}{5}$ $\frac{1}{6} \text{ of } 42 = \frac{42}{6}$ $\frac{2}{3} \text{ of } 30 = \frac{60}{3} \text{ or } \frac{30}{3} \times 2$ $\frac{4}{5} \text{ of } 25 = (25 \div 5) \times 4 \text{ or } \frac{4 \times 25}{5}$ 	

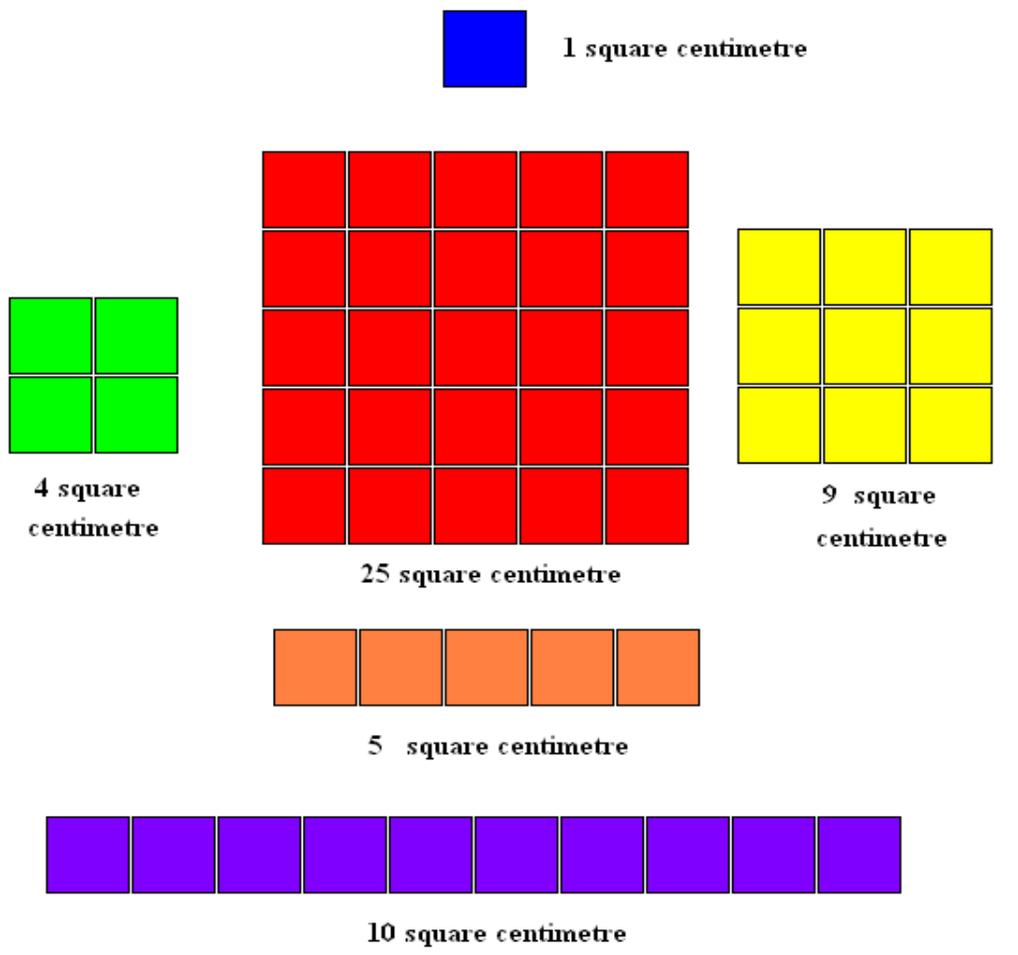
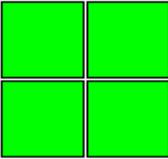
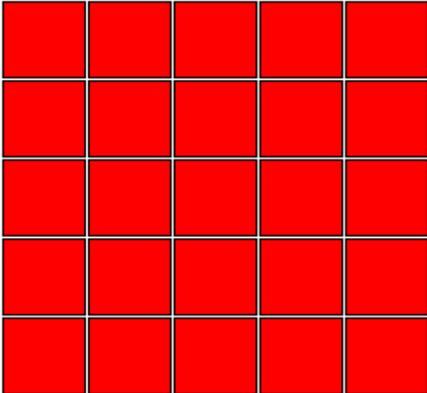
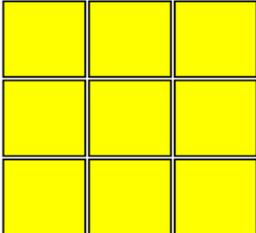
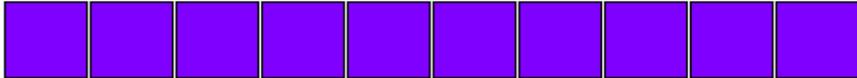
Learning Outcomes	Suggested Learning Activities (NUMBER & NUMBER SENSE)	Assessment
	<p>• Speak of and use diagrams to illustrate situations which relates to a fraction divided or multiplied by a whole number.</p> <p>- $4 \div \frac{1}{2}$ (interpret as 'how many halves in 4' and read result as eight halves) illustrates as</p>  <p style="text-align: center;">$4 \div \frac{1}{2} = 8 \text{ Halves}$</p>	
	<p>- $3 \div \frac{2}{3}$ (interpret as how many two-thirds in three and read result as '4 two-thirds are in 3 wholes) illustrate as</p>  <p style="text-align: center;">$2 \div \frac{2}{3} = 3 \text{ Halves}$</p> <p>• Multiple a fraction by a fraction or a whole number</p> <p>• Employ mental strategies and explain the strategies used to work out a percentage of a quantity. For example:</p> <p>- 10% of 140 (divide 140 by 10 because 10% $\equiv \frac{1}{10}$)</p> <p>- 25 % of 600 (divide by 600 by 4 because 25 % $\equiv \frac{1}{4}$)</p> <p>• Use the equivalence of fractions, decimals and percentages to solve problems</p>	

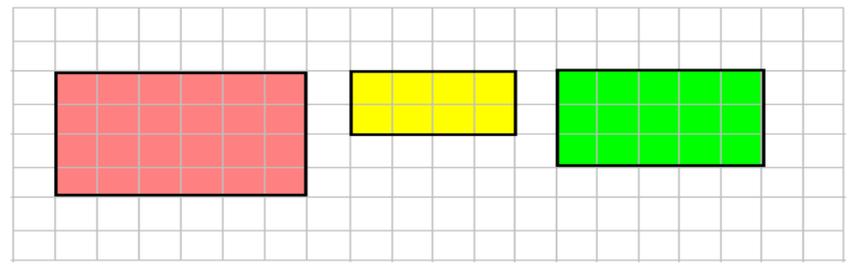
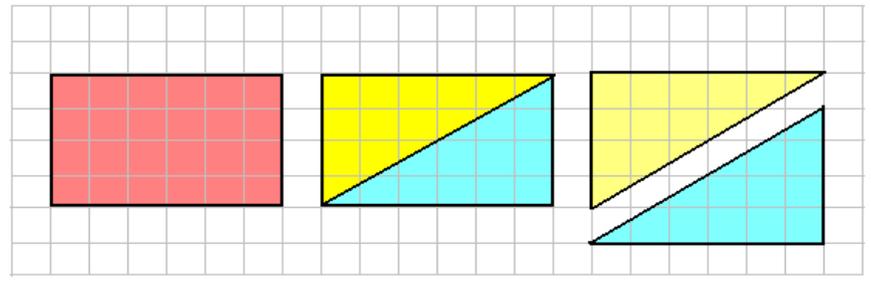
Learning Outcomes		
	Suggested Learning Activities (NUMBER & NUMBER SENSE)	Assessment
<p>LO:7</p> <p>Solve consumer arithmetic problems involving earning and spending money; taxes, interest, appreciation and depreciation.</p>	<ul style="list-style-type: none"> • Read and interpret the mathematical content samples of shopping bills. For example use shopping bills to: <ul style="list-style-type: none"> - distinguish between the VAT and the cost of the items listed; - work out the cost per items/total cost of items where several similar items are bought - determine the cost of items that are taxed or exempted • Use copies of household bills (water, electricity, telephone, internet, cable) to determine: <ul style="list-style-type: none"> - amount of units consumed; - the fixed charge if applied, - rate per unit, - total cost work out the • Use information on package along with price to calculate the price per article contained in package. For example calculate the price per biscuit given the price for the entire pack and the average number of biscuit in the pack. • Use such information to determine the 'best buy' for money of two similar articles • Write bills to reflect the total 	<ul style="list-style-type: none"> • Given sufficient information, students calculate profit, loss, percentage profit, percentage loss; discount, sale tax, percentages increase and decrease in price, hire purchase price, deposit, cash price • Students write short notes to explain the meaning of terms used in consumer arithmetic to include percentages • Given sufficient information, students calculate profit, loss, percentage profit, percentage loss; discount, sale tax, percentages increase and decrease in price, hire purchase price, deposit, cash price • Students perform calculations involving money to determine the unit cost of an item, the "Best Buy" for money • Students solve problems involving computations with money

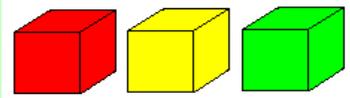
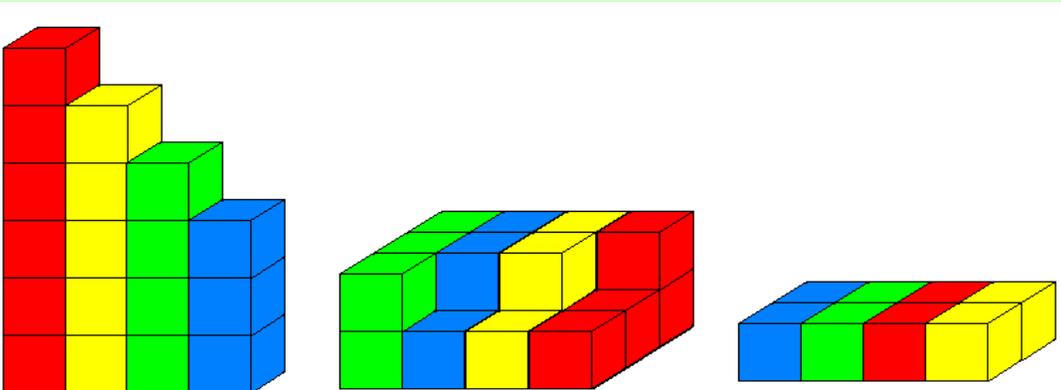
Learning Outcomes	Suggested Learning Activities (MEASUREMENT)	Assessment
<p>LO:1</p> <p>Estimate, measure, compare and record measurements of lengths, distances and perimeters using appropriate units and devices</p>	<ul style="list-style-type: none"> Engage students in activities that challenge them to practice the skill of estimation as a first step when measuring lengths, distance and perimeter Estimate the length of lines, objects, distances, perimeter, then explain how they arrived at their estimations. For eg. Estimate the length of your desk top, height of door, height of a student, depth of a bucket in terms of the length of each of these objects.  <ul style="list-style-type: none"> Measure the length of the same object in different units and record measurements obtained to compare between different units of measurement with the aim of deducing the relationship between mm and cm; cm and m; m and km. for eg. <ul style="list-style-type: none"> length of window 1m; 100cm length of class 7m; 700cm length of desk 1.2m; 120 cm Cut string to 1 metre length and use same to measure lengths in metres Measure lengths, distances and perimeter of objects in around classroom/school/ home using string, pencil length, match sticks, rulers, tape measure, meter sticks and explain why different students might obtain different measurement of the same object Construct tables to record, note and compare difference between estimation, and actual measurements 	<ul style="list-style-type: none"> Students construct and answer questions related to aspects of consumer arithmetic as depicted in advertisements collected from flyers and newspapers Compile a chart displaying pictures of objects of varying lengths with the lengths of the objects recorded in one/two/three units Perform actual tasks of measuring objects in different units Work in small groups to produce solutions to non-routine problems based on linear measurement.

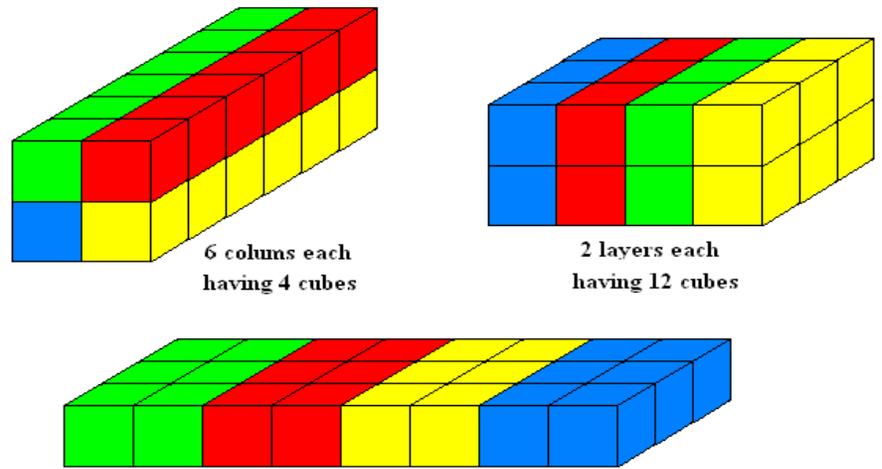
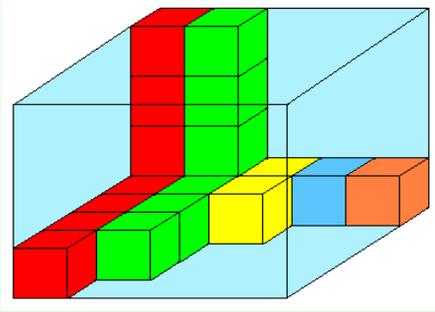
Learning Outcomes	Suggested Learning Activities (MEASUREMENT)	Assessment
	<p>• Develop understanding of the concept of perimeter as total distance around plane shapes by:</p> <ul style="list-style-type: none"> - putting a number of match sticks/ straws/rods of equal length and together to form polygons and talk about the total distance around each shape in terms of the number of sticks/ straws used.  <ul style="list-style-type: none"> - if each stick measures 5cm then the distance around equal) - place a piece of string around 2-D shapes then measuring the length of the string - measuring all sides of the shape then discussing the total distance around the shape <ul style="list-style-type: none"> • Calculate the perimeter of triangles quadrilaterals as well as composite shapes by measuring/adding all the sides • Describing one centimetre as 10 millimetre; one meter as 100 centimetre, one kilometre as 1 000 metre • Create and solve problems relating to measurement of length, distance and perimeter. For eg. How many other shapes can be made using the same number of match sticks as shown in this picture. 	<p>- There are only three triangles with perimeter 9. How many integer triangles are there with perimeter 10? 11? 12? ... (Draw 3 triangles)</p>  <ul style="list-style-type: none"> • The different units/ a ruler and starting at a different point than zero

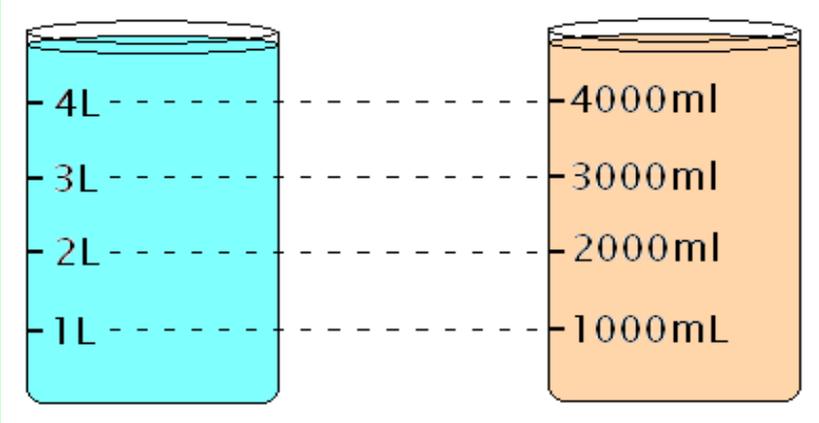
Learning Outcomes	Suggested Learning Activities (MEASUREMENT)	Assessment
<p>LO:2</p> <p>Estimate, measure, compare and record the areas of surfaces in square centimeters and square metres</p>	<p>• Engage students in activities that facilitate their development of a visual image of what one (1) square centimetre and one (1) square foot look like by cutting out one square centimetre and one (1) square foot from graph paper – sketch/draw outline of one square centimetre; identify/collect objects that are approximately the size of one square centimetre.</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div data-bbox="514 446 814 685" style="text-align: center;">  <p>1 cm</p> <p>1 cm</p> </div> <div data-bbox="1014 431 1323 708" style="text-align: center;">  <p>1 ft</p> <p>1ft</p> </div> </div> <div style="text-align: center; margin-top: 20px;">  </div> <p>• Use terms such as nearly; approximately; close to; almost; to communicate thinking when estimating area of shapes</p>	<p>Assessment</p> <ul style="list-style-type: none"> • Draw on grid paper several shapes having the same perimeter • Complete exercises involving calculations of perimeter and area of plane shapes • Work in small groups using cardboard to make square that cover an area of one square metre and using the same to measure large surfaces in square metres • Calculate the total area of given plane shapes • Draw 2D shapes on grid paper that enclosed the same area for example <div style="text-align: center; margin-top: 20px;"> <p>Each Shape has an area of 4 square units</p>  </div>

Learning Outcomes	Suggested Learning Activities (MEASUREMENT)	Assessment
	<p data-bbox="394 272 1543 418"> <ul style="list-style-type: none"> • Use 'cut outs' of one square centimetre to cover surfaces enclosed by plane shapes. • Make strips of ten square centimetre and squares of 25, 100 square centimetre from grid paper and use the same to count the number of square centimetre enclosed by 2-D shapes. </p> <div data-bbox="449 428 1467 1383" style="border: 1px solid black; padding: 10px; text-align: center;">  <p data-bbox="890 440 1257 516">  1 square centimetre </p> <p data-bbox="457 724 625 971">  4 square centimetre </p> <p data-bbox="709 578 1136 1019">  25 square centimetre </p> <p data-bbox="1184 656 1440 980">  9 square centimetre </p> <p data-bbox="722 1057 1146 1192">  5 square centimetre </p> <p data-bbox="491 1243 1348 1377">  10 square centimetre </p> </div>	<p data-bbox="1583 272 2011 435"> <ul style="list-style-type: none"> • Create and solve problems relating to area. For example Sketch rectangles each with an area of 36 square cm? How many such rectangles can you find? </p>

Learning Outcomes	Suggested Learning Activities (MEASUREMENT)	Assessment
	<ul style="list-style-type: none"> Record areas in “square centimetre” before gradually moving into the use of the abbreviation form of cm^2 Draw 2-D shapes on grid paper and counting the number of square centimetre enclosed – discuss strategies that can be applied to aid in counting the number of unit squares. For example; repeated addition of number in one row or column; Number of rows times number of columns.  <ul style="list-style-type: none"> Guide students through questioning to deduce a generalization that can be used to calculate the area of rectangles. Students should be encouraged to formulate their generalization in words first before moving to a more symbolic representation of their formula By folding and cutting, divide rectangles into equal triangles and speak of the area of each triangle so formed in relation to the area of the rectangle that was started with - Begin with rectangles that have no measurements. 	

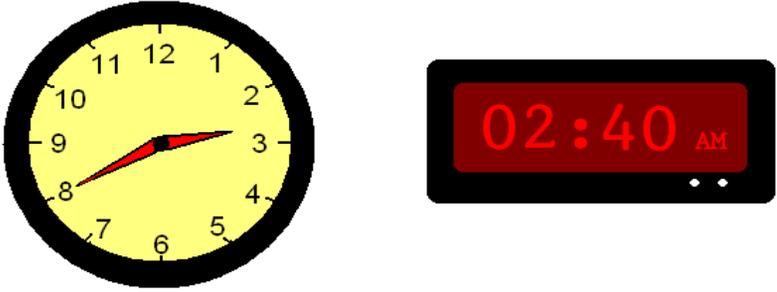
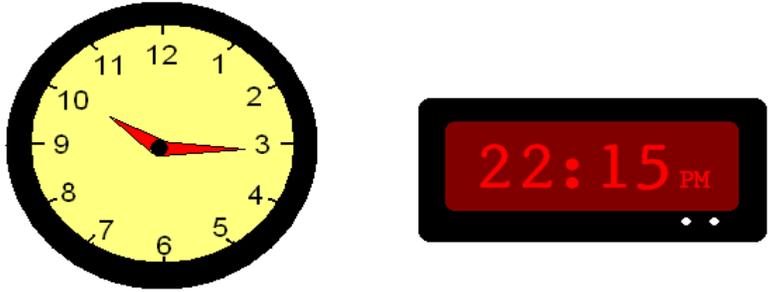
Learning Outcomes	Suggested Learning Activities (MEASUREMENT)		Assessment
<p>LO:3</p> <p>Estimate, measure, compare and record volume, capacity, and weight using appropriate units of measurement</p>	<p>• Volume & Capacity</p> <ul style="list-style-type: none"> • Estimate, measure, record and compare measurement of volumes and capacities to the nearest litre, millilitre; giving reasons for estimations and strategies used to obtain measurement. • Cut square paper measuring 1 unit X 1 unit (for example 1cm x 1 cm; 1inch X 1 inch) and use the same to make unit cubes (for example cubic centimetre blocks). Make sketches of a cubic centimetre block.  <ul style="list-style-type: none"> • Construct 3-D shapes using (unit cubes) cubic centimetre blocks and describe the volume of the shape so formed as the number of cubic centimeter blocks (unit cubes) used.  <p>18 Cubic Centimetres 20 Cubic Centimetres 8 Cubic Centimetres</p>		<ul style="list-style-type: none"> • Compute the volume of 3D given shapes. • Work in small groups to create and solve problems relating to volume, capacity and weight • Perform computations involving conversion from millilitres to litres and vice versa • Perform computations involving conversion from grams to kilograms; pounds to kilograms and vice versa • Make a chart showing the equivalence between millilitres and litres; grams and kilograms • Project work – make a graduated measuring instrument using containers marked to the half litre (500ml) or 1litre (1000ml)

Learning Outcomes	Suggested Learning Activities (MEASUREMENT)	Assessment
	<p data-bbox="401 282 1535 375">• Construct as many different shapes as possible using the same number of unit cubes and speak of them as having the same volume. For example all the cuboids have the same volume of 24 cubic units.</p> <div data-bbox="527 391 1409 954" style="text-align: center;">  <p data-bbox="726 630 884 683">6 columns each having 4 cubes</p> <p data-bbox="1094 630 1262 683">2 layers each having 12 cubes</p> <p data-bbox="747 873 1041 954">3 rows each having 8 cubes or 8 columns each having 3 cubes</p> </div> <p data-bbox="401 971 1535 1063">• Pack small containers shaped in the form of cuboids and cubes with cubic centimetre blocks (unit cubes) and describe packing in terms of number of layers of cubic centimetre blocks used. For example:</p> <div data-bbox="785 1065 1220 1377" style="text-align: center;">  </div>	

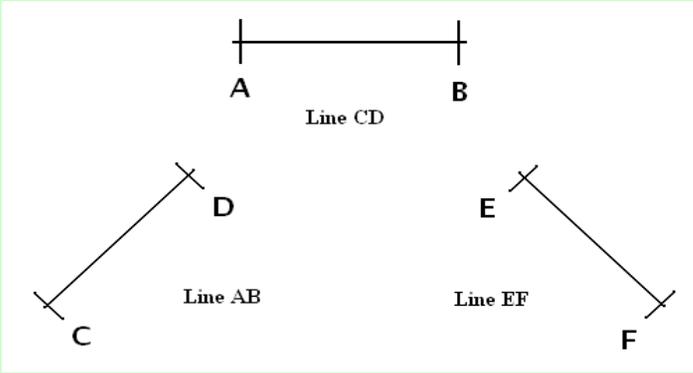
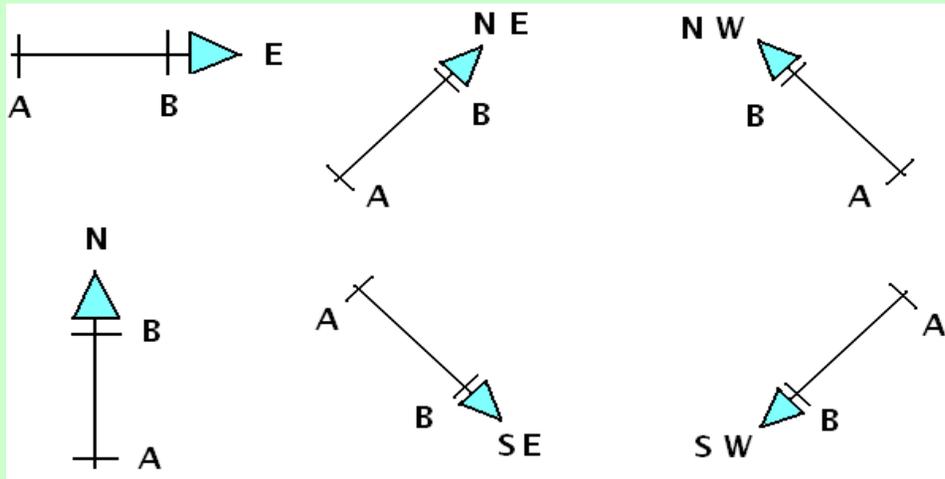
Learning Outcomes	Suggested Learning Activities (MEASUREMENT)	Assessment																
	<ul style="list-style-type: none"> • Tabulate results obtained and use such data as a guide in developing approaches to finding the volume of cubes and cuboids. <table border="1" data-bbox="590 365 1329 630"> <thead> <tr> <th>Length</th> <th>Width</th> <th>Height</th> <th>Volume</th> </tr> </thead> <tbody> <tr> <td>4</td> <td>5</td> <td>2</td> <td>40</td> </tr> <tr> <td>3</td> <td>4</td> <td>1</td> <td>12</td> </tr> <tr> <td>6</td> <td>2</td> <td>2</td> <td>24</td> </tr> </tbody> </table> <ul style="list-style-type: none"> • Construct cubes and cuboids from unit cubes and sketch an outline of the shape so formed clearly showing its dimension and volume • Collect, display, read and interpret information about capacity and volume as displayed on commercial package. • Empty containers containing varying quantities of litres into a measuring cylinder marked in millilitres and note the equivalence measurement between litre and millilitre. 	Length	Width	Height	Volume	4	5	2	40	3	4	1	12	6	2	2	24	
	Length	Width	Height	Volume														
4	5	2	40															
3	4	1	12															
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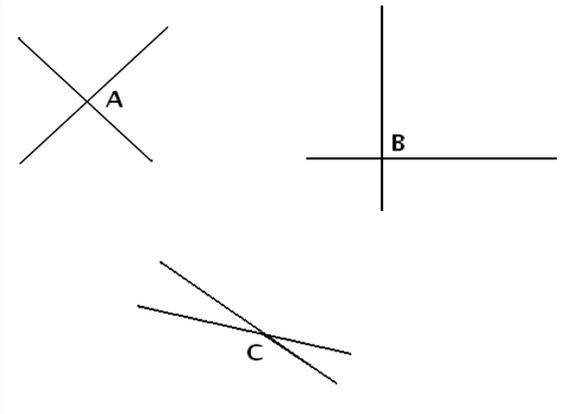
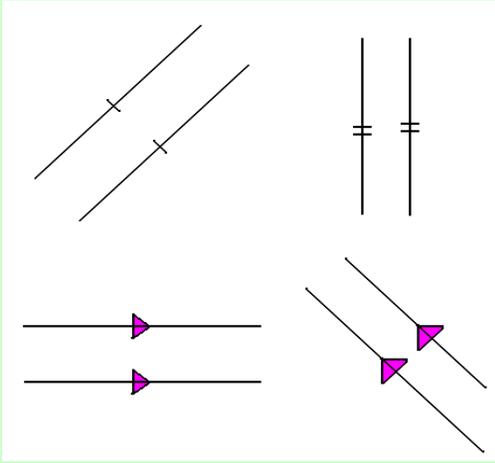
Learning Outcomes	Suggested Learning Activities (MEASUREMENT)	Assessment										
	<p>• Construct table of values and use same to deduce relationship between litre and milliliter. For example a study of the values in the table below, may be guided to verbalize statements such as:</p> <ul style="list-style-type: none"> - every 1 litre equals 1 000 millilitres - multiply the number of litres by 1 000 to get the corresponding number of milliliters - divide the number of milliliters to get the equivalence in litres <table border="1" data-bbox="724 602 1178 987" style="margin: 20px auto;"> <thead> <tr> <th>Litre</th> <th>Millitre</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>1000</td> </tr> <tr> <td>2</td> <td>2000</td> </tr> <tr> <td>5</td> <td>5000</td> </tr> <tr> <td>$\frac{1}{2}$</td> <td>500</td> </tr> </tbody> </table> <p>• Recognize and refer to 1, 000 millilitres as 1 litre and use the same to aid in conversion from one unit to another</p> <p>• Collect commercial containers that have a capacity of $\frac{1}{2}$litre, 1 litre, 2 litres</p>	Litre	Millitre	1	1000	2	2000	5	5000	$\frac{1}{2}$	500	
Litre	Millitre											
1	1000											
2	2000											
5	5000											
$\frac{1}{2}$	500											

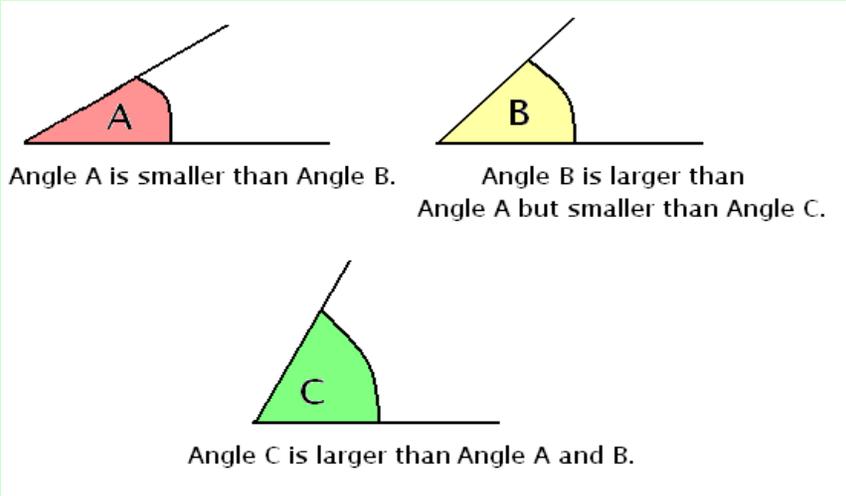
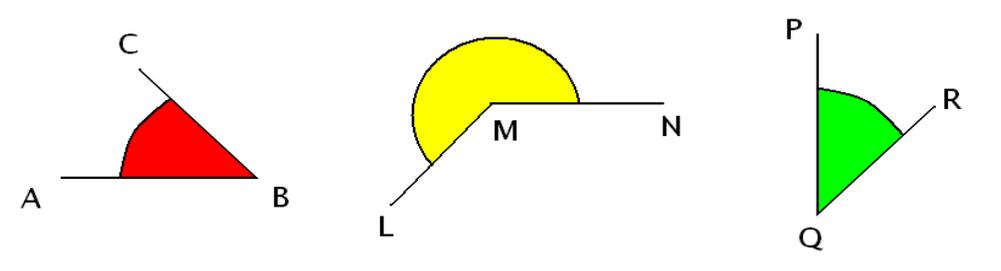
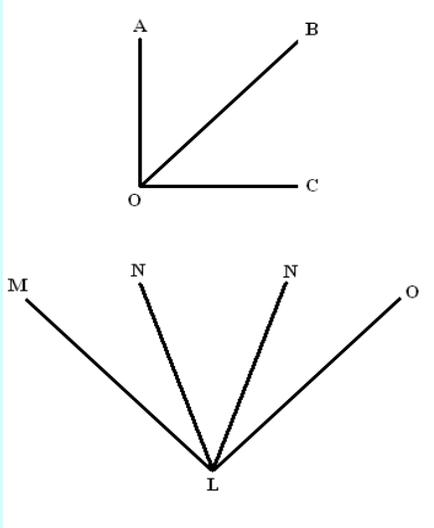
Learning Outcomes	Suggested Learning Activities (MEASUREMENT)	Assessment
	<p>• Weight</p> <ul style="list-style-type: none"> • Estimate, measure, record and compare measurements of mass to the nearest kilogram or pound; giving reasons for estimations and strategies used to obtain measurements • Measure different object having the same mass, such as 1 kg of lead and 1 kg of sugar • Perform actual measurement of the same item in different units of measurement and deduce the equivalence between different units of measurements. For example measure: <ul style="list-style-type: none"> - a quantity of sugar in pounds and kilograms - a quantity of rice in both grams and kilograms <div data-bbox="682 578 1318 1190" data-label="Image"> <p>The image contains two diagrams of a balance scale. The top diagram shows a balance scale with a weight labeled '1 kg' on the left pan and a weight labeled '1000g' on the right pan. The scale is balanced. The bottom diagram shows a balance scale with a weight labeled '1 kg' on the left pan and a weight labeled '2.2 lbs' on the right pan. The scale is balanced.</p> </div> <ul style="list-style-type: none"> • Recognize and refer to 1 000 grams as 1 kilograms and use the same to aid in conversion from one unit to another • Collect and read the labels on commercial packages that give information about weight • Use a scale to measure the content of commercial items to verify the accuracy of information as given • Solve problems involving measurement of weight 	

Learning Outcomes	Suggested Learning Activities (MEASUREMENT)	Assessment
<p style="text-align: center;">LO:4</p> <p>Read and record time; perform calculations involving mixed units of time</p>	<ul style="list-style-type: none"> • Estimate, measure and record in seconds, minutes and hours the time it will take to perform a task. Explain the approach taken to arrive at the estimation obtained • Relate the concept of common fractions ($\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$,) as used in association with the concept of time. For example. <ul style="list-style-type: none"> - half past 9 is 9:30 (as there is one hour between 9 o'clock and 10 o'clock and $\frac{1}{2}$ of an hour is 30 minutes) - quarter past two or 2:15 (as quarter of an hour is 15 minutes) - quarter to 8 or 7:45 (as only $\frac{1}{4}$ of the hour (15 minutes) remain before it is 8 o'clock) • Compare analog and digital time to the minute by looking at the display of the same time on both types of clock. For example 2:40 ; 20 minutes to 3 o'clock (3am) and 22:15 ; 15 minutes past 10 o'clock (10pm). <div style="text-align: center;">  <p>20 minutes to 3 o' clock</p>  <p>15 minutes past 10 o' clock</p> </div>	<ul style="list-style-type: none"> • Perform tasks involving the use of clocks/watches to measure the time it takes to perform a certain tasks. • Perform calculations involving measurement of time • Convert between the 24hour and 12hour clocks • Solve problems relating to measurement of time

Learning Outcomes		
	Suggested Learning Activities (MEASUREMENT)	Assessment
<p style="text-align: center;">LO:5</p> <p>Temperature Record and interpret and calculate measurement of temperature</p>	<ul style="list-style-type: none"> • Refer to the same length of time in different units. For example: <ul style="list-style-type: none"> - He took 60 seconds to perform the task. He took 1 minute to perform the task because 60 seconds equal 1 minute - She completed reading the book in 90 minutes. She completed reading the book in 1½ hours or 1 hour 30 minutes, because 60 minutes equals 1 hour - It will take 30 hours to walk the distance. It will take 1day 6 hours or 1 ¼ days to walk the distance because there are 24 hours in a day • Create and solve problems relating to time. <ul style="list-style-type: none"> • Read the thermometer (Measured in °C) <div data-bbox="411 773 1535 878" data-label="Figure"> </div> <ul style="list-style-type: none"> • Use the thermometer to carry out actual measurement of temperature of different objects. For example: <ul style="list-style-type: none"> - a block of ice - a glass of water placed out door on a very hot day compared with a glass of water placed inside a room - The body temperature of students • Measure and compare the temperature of the same object measured in both °C and °F. • Solve problems involving measurement of temperature • Link to related topics in Geography and Science 	<ul style="list-style-type: none"> • Record the reading of the temperature shown on the thermometer. • Perform calculations involving measurement of temperature

Learning Outcomes	Suggested Learning Activities (GEOMETRY)	Assessment
<p style="text-align: center;">LO:1</p> <p>Line & Line Segments Use accurately the vocabulary and labeling conventions for lines and line segments</p>	<p>• Use capital letters to label the end points of lines segments and refer to such line segments using the letters</p> <div style="text-align: center;">  </div> <p>• Draw and speak line segments moving in different directions (vertical, horizontal, basic cardinal directions)</p> <div style="text-align: center;">  </div>	<ul style="list-style-type: none"> • Write short notes to differentiate between a line and a line segments • Group a set of lines under different headings. For example parallel, perpendicular, horizontal and vertical. • Draw a line that is parallel or perpendicular to a given line

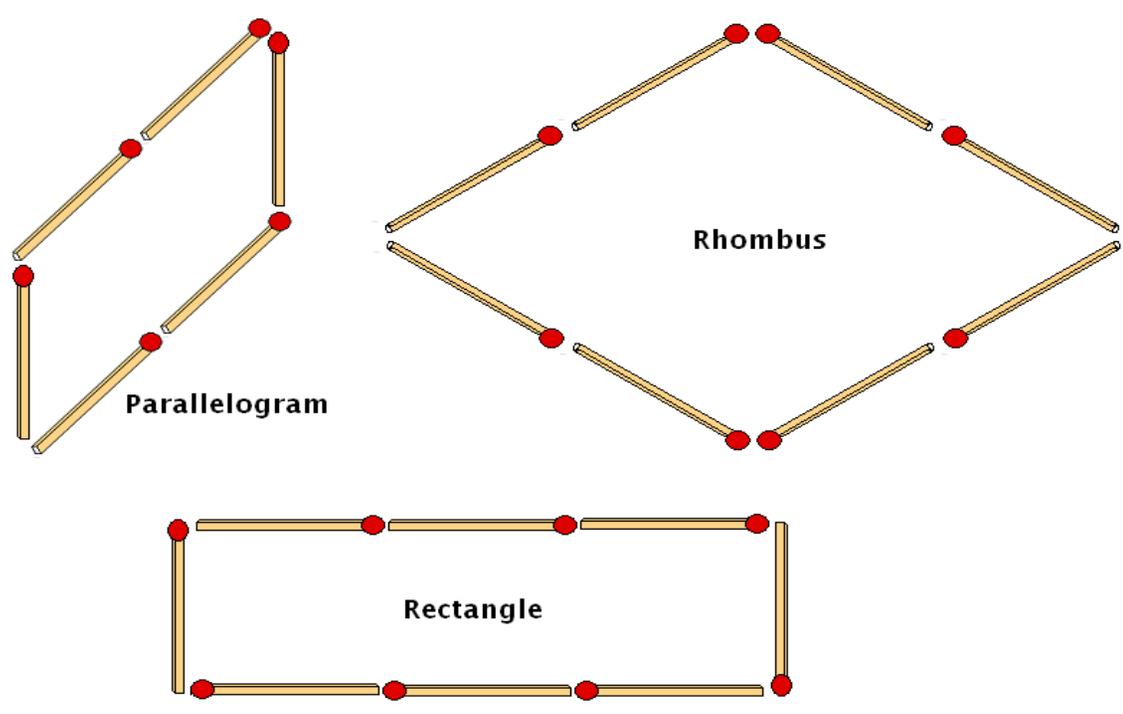
Learning Outcomes	Suggested Learning Activities (GEOMETRY)	Assessment
	<p data-bbox="401 289 1524 350">• Draw pairs of lines in different orientations that meet and refer to the position where they meet as the point of intersection</p> 	
	<p data-bbox="401 841 1451 902">• Draw/extend pair of lines and talk of the possibility of these lines meeting or not meeting • Use symbols to show that two lines are parallel/ equal.</p> 	

Learning Outcomes	Suggested Learning Activities (GEOMETRY)	Assessment
<p style="text-align: center;">LO:2</p> <p>Angles Identify properties of angles and use such knowledge to solve problems</p>	<p>• Manipulate different objects (for example pair of scissors, door, hands of clocks); and talk freely about the amount of turns</p> <p>• Draw sketches of angles and speak about the size of one angle in terms of the amount of turns in relation to the size of another angle</p> <div style="text-align: center;">  <p>Angle A is smaller than Angle B. Angle B is larger than Angle A but smaller than Angle C.</p> <p>Angle C is larger than Angle A and B.</p> </div> <p>• Guide students to label the arms of angles and recognize that both arms forming an angle share a common letter.</p> <div style="text-align: center;">  </div>	<p>• Classify given angles by type</p> <p>• Sketch examples of various types of angles in different orientations</p> <p>• Respond to questions such as: - Name the different types of angles shown in the figure below:</p> <div style="text-align: center;">  </div>

Learning Outcomes	Suggested Learning Activities (GEOMETRY)	Assessment
	<ul style="list-style-type: none"> • Read and discuss the features of the protractor – recognizing that the protractor can be read from both clockwise and anticlockwise directions • Use the protractor to draw angles of different sizes (multiples of 10°) up to 180°. • Use the protractor to measure angles. Begin with angles which have one arm in the horizontal position and whose magnitude is a multiple of 10°. <div data-bbox="411 565 1503 857" style="text-align: center;"> </div> <ul style="list-style-type: none"> • Speak of/ sketch angles in different orientations that fit the following descriptions <ul style="list-style-type: none"> - Less than 90° - More than 90° but less than 180° - More than 180° • Draw/ sketch the 180° in different orientations and clearly showing where the two line segments meet to form the angle 	

Learning Outcomes	Suggested Learning Activities (GEOMETRY)		Assessment
<p style="text-align: center;">LO:3</p> <p>Polygons (Triangle) Identify and use the geometrical properties of triangles in problem solving</p>	<ul style="list-style-type: none"> From practical work, involving comparison of examples and non examples of polygons deduce in their own words a working definition of the term polygon Explore by measurement/comparison; the linear and angular properties of the different types of triangles (scalene, isosceles, equilateral, acute angled, obtuse angled and right angled triangles) <div style="text-align: center; border: 1px solid black; padding: 10px; margin: 10px 0;"> <p>equilateral scalene isosceles</p> <p>right angled acute angled obtuse angled</p> </div>		<ul style="list-style-type: none"> Classify given triangles by type. Sketch triangles to match stated properties Determine the missing side or angle of a triangle based on the properties of the given triangle. Calculate given sides or angles in given quadrilaterals Project work For example make a chart consisting of examples of different types of triangles Use properties of triangles in solving problems write short notes to explain: <ul style="list-style-type: none"> Why a triangle can be both acute angled and equilateral at the same time Why a triangle can be both right angled and isosceles at the same time Why a triangle cannot be obtuse angled and right angled at the same time

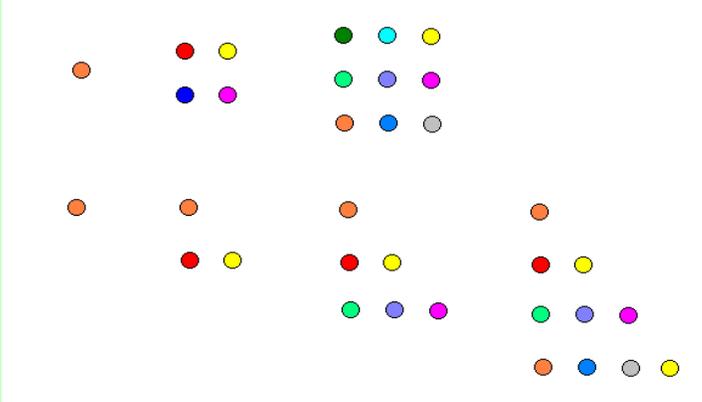
Learning Outcomes	Suggested Learning Activities (GEOMETRY)	Assessment
	<ul style="list-style-type: none"> • Draw /sketch and cut out triangles that fit a particular description <ul style="list-style-type: none"> - all angles less than 90° - two equal angles - no equal angle - a 90° angle • Describe a sketch of a triangle in sufficient details for other students to draw/ sketch. • Label/name and refer to triangles using capital letters at the vertices. This triangle is referred to as triangle LMN. <div data-bbox="428 695 1503 1003" style="text-align: center;"> <p>The image shows three triangles. The first is a right-angled triangle with vertices L (top), M (bottom-left), and N (bottom-right). A right-angle symbol is at vertex M. The second is a triangle with vertices A (left), B (top), and C (bottom-right). Angle A is labeled 45 and angle C is labeled 75. The third is a triangle with vertices R (top), S (bottom-left), and T (bottom-right). Angle S is labeled 110.</p> </div> <ul style="list-style-type: none"> • Apply geometrical facts, properties and relationships to solve numerical problems such as finding unknown sides and angles in diagrams, and justifying their solutions to problems by giving reasons using their own words 	

Learning Outcomes	Suggested Learning Activities (GEOMETRY)	Assessment
<p style="text-align: center;">LO:4</p> <p>Polygons (Quadrilaterals) Identify and use the geometric properties of quadrilaterals in solving problems</p>	<p>• Use match sticks of equal lengths to form different four sided figures (rectangles, squares, trapeziums, parallelograms, rhombuses) and refer each shape as an example of a quadrilateral.</p> <div style="text-align: center;">  <p>The image shows three quadrilaterals constructed from matchsticks. The top-left one is a parallelogram with two long sides and two short sides. The top-right one is a rhombus with four equal sides. The bottom one is a rectangle with two long horizontal sides and two short vertical sides. Each vertex is marked with a red dot.</p> </div>	<p>Assessment</p> <ul style="list-style-type: none"> • State the properties of named quadrilaterals • Sketch quadrilaterals to match stated properties • Calculate missing angles/sides in given quadrilaterals • Project work For example make a chart consisting of examples of different types of quadrilaterals

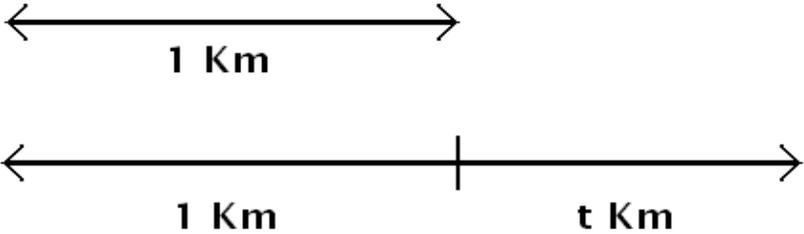
Learning Outcomes	Suggested Learning Activities (GEOMETRY)	Assessment
	<ul style="list-style-type: none"> • Classify a given set of quadrilaterals in terms of linear and angular properties and explain the rule that was used to form the respective grouping. • Label quadrilaterals using capital letters and use such labeling to speak of one side/angle of the quadrilateral in relation to another side/angle. for example in the rectangle below $AB = CD$; $AC = BD$; AB is parallel to CD angles A, B, C, & D are all equal. <div data-bbox="590 594 1274 896" data-label="Image"> </div>	
	<ul style="list-style-type: none"> • Produce/draw/sketch rectangles and squares by following basic Cardinal directions. For example. Start at a point A, move 5 cm to the South, label that point B, move 5 cm to the East, label that point C; move 5cm to the North, label that point D; move to the West and stop at A. • Estimate, measure, record, speak of and justify: <ul style="list-style-type: none"> - The sum of angles in any quadrilateral equals 360° - relationship between opposite sides and angles in different quadrilaterals • Sketch/draw examples of quadrilaterals in different orientations • Apply knowledge of quadrilaterals to solve problems. 	

Learning Outcomes	Suggested Learning Activities (GEOMETRY)	Assessment
<p>LO:5</p> <p>Solid Shapes Recognize the properties of solids and apply such knowledge to solve problems</p>	<p>• Describe different solids in terms of their shape and number of faces;</p> <div data-bbox="443 467 1457 1192" data-label="Image"> <p>The image displays five distinct 3D solids arranged on a white background. At the top left is a green cylinder. In the center is a blue sphere. To the right is an orange cone. At the bottom left is an orange cube. At the bottom right is a cyan cuboid. Below each solid is its name in bold black text: 'Cylinder', 'Sphere', 'Cone', 'Cube', and 'Cuboid'.</p> </div>	<ul style="list-style-type: none"> • Categorize a set of objects or pictures of solid objects according to type • Draw nets to match given solids and vice versa. • Project Work For example use cardboard to make a collection of different solids

Learning Outcomes		
	<p style="text-align: center;">Suggested Learning Activities (GEOMETRY)</p> <ul style="list-style-type: none"> • Cut down solid shapes and sketch the corresponding nets so obtained • Make solid shapes from cardboards 	<p style="text-align: center;">Assessment</p> <ul style="list-style-type: none"> • Categorize a set of objects or pictures of solid objects according to type • Draw nets to match given solids and vice versa. • Project Work For example use cardboard to make a collection of different solids
<p style="text-align: center;">LO:6</p> <p>Transformation Geometry Identify properties of transformation and use such knowledge to solve problems relating to geometry</p>	<ul style="list-style-type: none"> • Manipulate an object and speak of/sketch its positions before and after its has been manipulated • Rotate linear objects about a fixed position and discuss/sketch the object in its original and new positions. • Pin 'cut outs' of triangles and rectangles at one vertex, rotate the shape about that position and discuss/sketch the object in its original and new positions. • Translate objects by moving such objects to the left, right, up or down • By folding papers and tracing produce an original diagram and its image 	<ul style="list-style-type: none"> • Sketch diagrams to show an object and its image after a transformation • Name the type of transformation illustrated in a diagram that shows the object and its image

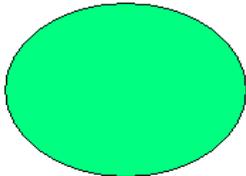
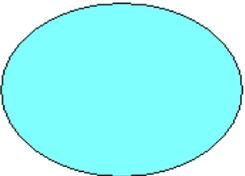
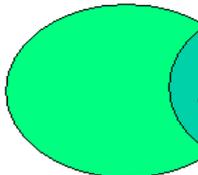
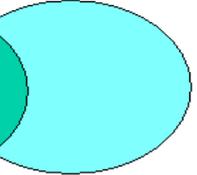
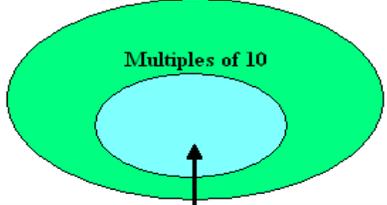
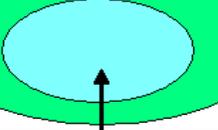
Learning Outcomes	Suggested Learning Activities (PATTERN & ALGEBRA)	Assessment
<p style="text-align: center;">LO:1</p> <p>Generate, describe and complete number and geometrical patterns using a variety of strategies and completing simple number sentences by calculating missing values</p>	<ul style="list-style-type: none"> • Generate a variety of number patterns by counting forward and backward in different ways. For example; <ul style="list-style-type: none"> - 3, 6, 9, - 1, 4, 8, 13, - 1, 4, 9, 16, - 19, 18, 16, 13, - 3.32, 3.29, 3.26, 3.23, - 1/3, 2/3, 3/3, 4/3, • Describe simple number patterns in words • Illustrate, model, record simple number patterns using diagrams, words or symbols. For example. <div style="text-align: center; margin: 10px 0;">  </div> <ul style="list-style-type: none"> • Complete simple patterns and explain strategies used in oral and written forms • Use the equal sign to record equivalent number relationships to mean “is the same as” rather than as an indication to perform an operation. For example; <ul style="list-style-type: none"> - $24 \times 3 = 77 - 5$; $100 \div 4 = 16 + 9$ - • Use inverse operations to complete and find solutions to number statements. For example; <ul style="list-style-type: none"> - $25 + \square = 49$ implies $49 - 25 = \square$ - $\square - 17 = 73$ implying $\square = 73 + 17$ - $\square \div 9 = 20$ implying $\square = 20 \times 9$ • Use data from the pattern to construct and complete tables of values 	<ul style="list-style-type: none"> • Complete and extend a given number sequence • Describe orally and in short notes the general rule governing a number sequence • List a set of numbers that match a given rule • Generate a number series and state the rule governing the series

Learning Outcomes	Suggested Learning Activities (PATTERN & ALGEBRA)	Assessment																			
<p>LO: 2, 3 & 4</p> <p>Construct, simplify and transform algebraic expressions</p>	<ul style="list-style-type: none"> • Verbalize algebraic expressions through practical activities. • Use concrete materials such as counters, cups, boxes to model algebraic expressions of the form: <ul style="list-style-type: none"> - $p + 1$; $p + 4$ (variable plus a constant) - $p - 5$; $p - 5$ (variable minus a constant). For example the expression '$p + 1$' may be presented as a cup of similar objects plus a single object where the cup of objects represents p and 1 the single object • Create physical (geometrical) models to translate verbal statements into symbolic representations. For example, use rods to generate algebraic expressions of lengths. <div data-bbox="564 607 1312 857" style="border: 1px solid black; padding: 10px; margin: 10px 0;"> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="border: 1px solid black; padding: 5px; text-align: center;">$a + 2 \text{ cm}$</td> </tr> <tr> <td style="border: 1px solid black; padding: 5px;"> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="border: 1px solid black; padding: 5px; text-align: center;">$a \text{ cm}$</td> <td style="border: 1px solid black; padding: 5px; text-align: center;">2 cm</td> </tr> </table> </td> </tr> </table> </div> <div data-bbox="506 922 1369 1338" style="border: 1px solid black; padding: 10px; margin: 10px 0;"> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="border: 1px solid black; padding: 5px; text-align: center;">$b \text{ cm}$</td> <td style="border: 1px solid black; padding: 5px; text-align: center;">$b \text{ cm}$</td> <td style="border: 1px solid black; padding: 5px; text-align: center;">$b \text{ cm}$</td> </tr> <tr> <td colspan="3" style="border: 1px solid black; padding: 5px; text-align: center;">$b + b + b$</td> </tr> <tr> <td colspan="3" style="border: 1px solid black; padding: 5px; text-align: center;">$3 \times b$</td> </tr> </table> </div>	$a + 2 \text{ cm}$	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="border: 1px solid black; padding: 5px; text-align: center;">$a \text{ cm}$</td> <td style="border: 1px solid black; padding: 5px; text-align: center;">2 cm</td> </tr> </table>	$a \text{ cm}$	2 cm	$b \text{ cm}$	$b \text{ cm}$	$b \text{ cm}$	$b + b + b$			$3 \times b$			<p>Translate verbal statements and geometrical representations into symbolic forms. For example:</p> <div data-bbox="1579 448 2013 630" style="border: 1px solid black; padding: 10px; margin: 10px 0;"> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="border: 1px solid black; padding: 5px; text-align: center;">t</td> <td style="border: 1px solid black; padding: 5px; text-align: center;">5</td> <td style="border: 1px solid black; padding: 5px; text-align: center;">t</td> </tr> <tr> <td colspan="3" style="border: none; text-align: center;">$2t + 5$</td> </tr> </table> </div> <ul style="list-style-type: none"> • Write verbal statements to match algebraic expressions • Simplify algebraic expressions • Rewrite a given algebraic expressions in as many ways as possible 	t	5	t	$2t + 5$		
$a + 2 \text{ cm}$																					
<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="border: 1px solid black; padding: 5px; text-align: center;">$a \text{ cm}$</td> <td style="border: 1px solid black; padding: 5px; text-align: center;">2 cm</td> </tr> </table>	$a \text{ cm}$	2 cm																			
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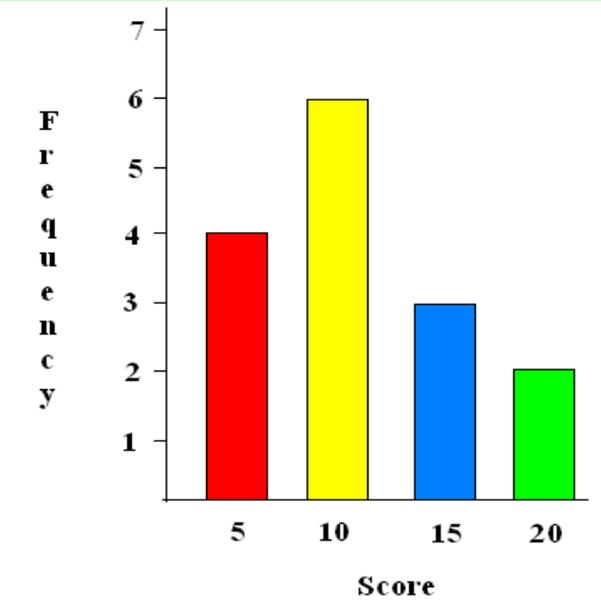
Learning Outcomes	Suggested Learning Activities (PATTERN & ALGEBRA)	Assessment
	<p data-bbox="401 280 1486 375">• Work in pairs; one student gives a verbal expression and the other student models the expression using concrete objects/pictures. For example; I walk one km my sister walks t km more than I. This may be model as shown.</p> <div data-bbox="527 488 1436 834" style="border: 1px solid black; padding: 10px; text-align: center;"><p>The diagram shows two horizontal number lines. The top line is a single segment with arrows at both ends, labeled "1 Km" below it. The bottom line is a longer segment with arrows at both ends, divided into two parts by a vertical tick mark. The left part is labeled "1 Km" and the right part is labeled "t Km" below it.</p></div>	

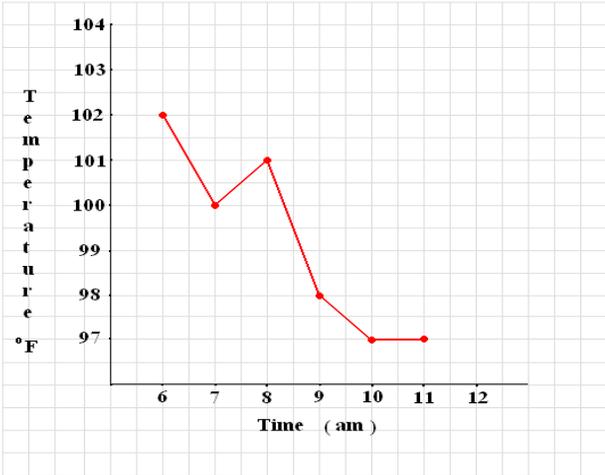
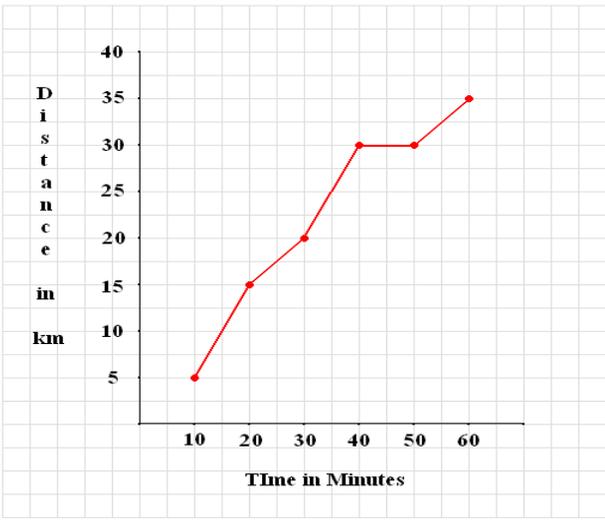
Learning Outcomes		
	Suggested Learning Activities (PATTERN & ALGEBRA)	Assessment
<p>LO: 5</p> <p>Construct and solve algebraic equations and inequalities</p>	<ul style="list-style-type: none"> • Use the equal sign to record equivalent number relationships to mean “is the same as” rather than as an indication to perform an operation. For example; <ul style="list-style-type: none"> - $24 \times 3 = 77 - 5$; - $100 \div 4 = 16 + 9$ • Make conclusions based on simple equations. For example: <ul style="list-style-type: none"> - if $t = m$, then $m = t$ - if $3 + 5 = 8$, then $3 = 8 - 5$ or $5 = 8 - 3$ - if $p = t + n$, then $t = p - n$ • Use inverse operations to complete and find solutions to number statements. For example; <ul style="list-style-type: none"> - $25 + \square = 49$ implies $49 - 25 = \square$ - $\square - 17 = 73$ implying $\square = 73 + 17$ - $\square \div 9 = 20$ implying $\square = 20 \times 9$ • Substitute given values for letters in simple equations. For example: <ul style="list-style-type: none"> - if $q = 4$ and $r = 0$, then $q + r = 4 + 0$ - if $w = 5$ and $v = 6$, then $w \times v = 5 \times 6$ • Use data from patterns to construct and complete tables of values • Apply knowledge of algebraic expression and equations in solving problems 	<ul style="list-style-type: none"> • Write the inverse of given number sentences • Solve simple numeric and algebraic equations • Substitute numeric values into equations

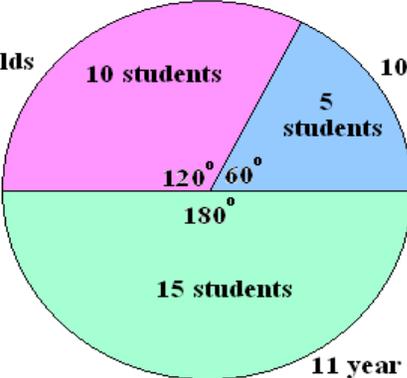
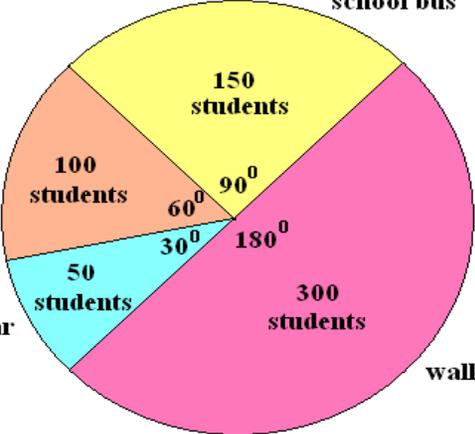
Learning Outcomes	Suggested Learning Activities (DATA HANDLING)	Assessment
<p style="text-align: center;">LO: 1</p> <p>Use set notations to organize information and; solve problems</p>	<ul style="list-style-type: none"> • Make listings of special mathematical sets. For example: <ul style="list-style-type: none"> - the set of multiples of a given number - the set of factors of a given number - the set of prime numbers between two given numbers - the set of quadrilaterals - the set of triangles - the set of solid shapes with curve surfaces (faces) - the set of solid shapes with square faces • Make pairs of sets that are equal or equivalent. For example: <ul style="list-style-type: none"> $\{1, 2, 3\} = \{3, 2, 1\}$ both sets having the same elements (members) $\{a, e, i, o, u\} \equiv \{1, 2, 3, 4, 5\}$ - both sets have the same number of elements • Make use of set notations to show relationships between a set and its members; between two sets. For example if: <ul style="list-style-type: none"> $A = \{\text{multiples of 7 less than 35}\}$ $B = \{\text{factors of 21}\}$ - $21 \in A$ - $42 \notin A$ - $A \cup B = \{1, 3, 7, 14, 21, 28\}$ - $A \cap B = \{7\}$ • Use knowledge of the relationships between different types of numbers to construct statements. For example: <ul style="list-style-type: none"> - the set of factors of 12 $\{1,2,3,4,6,12\}$ a infinite set (it is possible to write all the members) - the set of odd numbers is set $\{1,3,5,7,9,\dots\}$ an infinite set (it is impossible to write all the members) - the set of even numbers $\{2,4,6,8,10,\dots\}$ - the set of whole numbers between 3 and 4 $\equiv \{ \}$ or \emptyset - a null set (it has no member) 	<ul style="list-style-type: none"> • Make a set to match a given description and vice versa • Identify common elements of two sets • Draw simple Venn diagrams between sets • Give example to illustrate the meaning of set notation/language • Respond to question based on information presented on Venn diagrams

Learning Outcomes	Suggested Learning Activities (DATA HANDLING)	Assessment
	<p>Link set theory to number theory</p> <ul style="list-style-type: none"> • Make Venn diagrams to investigate the relationships between different types of numbers. For example: <div data-bbox="604 402 1310 1349" style="border: 1px solid black; padding: 10px; margin: 10px auto; width: fit-content;"> <p style="text-align: center;">Whole numbers from 1 to 20</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> <p>Multiples of 10</p>  </div> <div style="text-align: center;"> <p>Multiples of 3</p>  </div> </div> <p style="text-align: center;">Whole numbers</p> <div style="display: flex; justify-content: center; align-items: center;"> <div style="text-align: center;"> <p>Square numbers</p>  </div> <div style="text-align: center;"> <p>Even numbers</p>  </div> </div> <p style="text-align: center;">These numbers are both even + square</p> <p style="text-align: center;">Whole numbers</p> <div style="display: flex; justify-content: center; align-items: center;"> <div style="text-align: center;"> <p>Multiples of 5</p>  </div> <div style="text-align: center;"> <p>Multiples of 10</p>  </div> </div> <p style="text-align: center;">Each Multiple of 10 is a Multiple of 5</p> </div> <ul style="list-style-type: none"> • Use knowledge of set theory in solving problems. 	

Learning Outcomes																	
<p style="text-align: center;">LO: 2</p> <p>Design and use simple instrument for relevant data collection</p>	Suggested Learning Activities (DATA HANDLING)	Assessment															
	<ul style="list-style-type: none"> • Suggest methods that can be used to collect data relevant to a given question. For example: <ul style="list-style-type: none"> - How tall are the students in our class/school? (By direct measure) - What are the shoe sizes of students in our class? (By asking students) - What method of transport do students use to travel to school? (By asking students) - Which is the most used vowel? (By counting the occurrence of each vowel in samples of written materials) - Link to studies in other subject discipline • Collect data relative to issues which are current/ of interest to students. For example: <ul style="list-style-type: none"> - amount of money spent by class members on lunch, transportation - length of time spent by students doing work home • Design sheets to aid in the efficient collection of data relevant to identified issues/ questions. For example: <ul style="list-style-type: none"> - A table for collecting data relating to height of students <div style="text-align: center; margin: 10px 0;"> <table border="1" style="border-collapse: collapse; width: 150px; margin: auto;"> <tr> <td style="padding: 5px; text-align: center;">Name</td> <td style="padding: 5px; text-align: center;">Height</td> </tr> <tr> <td style="height: 30px;"></td> <td style="height: 30px;"></td> </tr> </table> </div> <ul style="list-style-type: none"> - A tally chart for collecting the occurrence of vowels in passages <div style="text-align: center; margin: 10px 0;"> <table border="1" style="border-collapse: collapse; width: 300px; margin: auto;"> <tr> <td style="padding: 5px; text-align: center;">Vowel</td> <td style="padding: 5px; text-align: center;">a</td> <td style="padding: 5px; text-align: center;">e</td> <td style="padding: 5px; text-align: center;">i</td> <td style="padding: 5px; text-align: center;">o</td> <td style="padding: 5px; text-align: center;">u</td> </tr> <tr> <td style="padding: 5px; text-align: center;">Count</td> <td style="height: 30px;"></td> </tr> </table> </div>	Name	Height			Vowel	a	e	i	o	u	Count					
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Learning Outcomes	Suggested Learning Activities (DATA HANDLING)		Assessment																								
<p>LO: 3</p> <p>Organize and display data using different forms of presentations</p>	<p>•Organize and present ungrouped data in the form of tables. For example: - This list of scores (10, 15, 20, 10, 10, 20, 10, 5, 10, 5, 15, 15, 5, 10, 5) may be presented in a tally chart or ungrouped frequency table as follows:</p> <table border="1" data-bbox="527 396 1339 691"> <thead> <tr> <th colspan="2" data-bbox="527 396 873 428">Tally chart</th> <th colspan="2" data-bbox="984 396 1339 428">Ungrouped frequency table</th> </tr> <tr> <th data-bbox="527 428 699 477">Score</th> <th data-bbox="699 428 873 477">Tally</th> <th data-bbox="984 428 1157 477">Score</th> <th data-bbox="1157 428 1339 477">Frequency</th> </tr> </thead> <tbody> <tr> <td data-bbox="527 477 699 526">5</td> <td data-bbox="699 477 873 526"></td> <td data-bbox="984 477 1157 526">5</td> <td data-bbox="1157 477 1339 526">4</td> </tr> <tr> <td data-bbox="527 526 699 574">10</td> <td data-bbox="699 526 873 574"></td> <td data-bbox="984 526 1157 574">10</td> <td data-bbox="1157 526 1339 574">6</td> </tr> <tr> <td data-bbox="527 574 699 623">15</td> <td data-bbox="699 574 873 623"></td> <td data-bbox="984 574 1157 623">15</td> <td data-bbox="1157 574 1339 623">3</td> </tr> <tr> <td data-bbox="527 623 699 688">20</td> <td data-bbox="699 623 873 688"></td> <td data-bbox="984 623 1157 688">20</td> <td data-bbox="1157 623 1339 688">2</td> </tr> </tbody> </table> <p>• Organize and present data in the form of bar charts. For example:</p>  <p>The bar chart displays the frequency of scores. The vertical axis is labeled 'Frequency' and ranges from 0 to 7. The horizontal axis is labeled 'Score' and has categories 5, 10, 15, and 20. The bars are colored: 5 is red (height 4), 10 is yellow (height 6), 15 is blue (height 3), and 20 is green (height 2).</p>		Tally chart		Ungrouped frequency table		Score	Tally	Score	Frequency	5		5	4	10		10	6	15		15	3	20		20	2	<ul style="list-style-type: none"> • Construct/complete tables/tally charts to organize raw data • Construct tables, line graphs, bar charts, and simple pie charts from a given set of data
Tally chart		Ungrouped frequency table																									
Score	Tally	Score	Frequency																								
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Learning Outcomes	Suggested Learning Activities (DATA HANDLING)	Assessment																												
	<p data-bbox="401 280 1203 310">• Organize and present data in the form of line graphs: For example:</p> <div data-bbox="611 326 1224 833"> <p data-bbox="772 329 1100 350">Body Temperature of an Individual</p>  <table border="1" data-bbox="615 354 1220 829"> <caption>Body Temperature of an Individual</caption> <thead> <tr> <th>Time (am)</th> <th>Temperature (°F)</th> </tr> </thead> <tbody> <tr><td>6</td><td>102</td></tr> <tr><td>7</td><td>100</td></tr> <tr><td>8</td><td>101</td></tr> <tr><td>9</td><td>98</td></tr> <tr><td>10</td><td>97</td></tr> <tr><td>11</td><td>97</td></tr> </tbody> </table> </div> <div data-bbox="611 846 1224 1393"> <p data-bbox="793 849 1073 870">Travelling to school in a car</p>  <table border="1" data-bbox="615 870 1220 1390"> <caption>Travelling to school in a car</caption> <thead> <tr> <th>Time in Minutes</th> <th>Distance in km</th> </tr> </thead> <tbody> <tr><td>10</td><td>5</td></tr> <tr><td>20</td><td>15</td></tr> <tr><td>30</td><td>20</td></tr> <tr><td>40</td><td>30</td></tr> <tr><td>50</td><td>30</td></tr> <tr><td>60</td><td>35</td></tr> </tbody> </table> </div>	Time (am)	Temperature (°F)	6	102	7	100	8	101	9	98	10	97	11	97	Time in Minutes	Distance in km	10	5	20	15	30	20	40	30	50	30	60	35	
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Learning Outcomes	Suggested Learning Activities (DATA HANDLING)	Assessment																														
	<p data-bbox="411 285 1201 313">• Organize and present data in the form of pie charts. For example:</p> <div data-bbox="606 329 1262 774" style="border: 1px solid black; padding: 10px; margin: 10px auto; width: fit-content;"> <p data-bbox="716 334 1173 358" style="text-align: center;">Pie Chart showing age of 30 students</p>  <table border="1" data-bbox="611 435 1255 764"> <caption>Data for Pie Chart showing age of 30 students</caption> <thead> <tr> <th>Age Group</th> <th>Number of Students</th> <th>Angle (degrees)</th> </tr> </thead> <tbody> <tr> <td>12 year olds</td> <td>10</td> <td>120°</td> </tr> <tr> <td>11 year olds</td> <td>15</td> <td>180°</td> </tr> <tr> <td>10 year olds</td> <td>5</td> <td>60°</td> </tr> </tbody> </table> </div> <div data-bbox="642 786 1211 1318" style="border: 1px solid black; padding: 10px; margin: 10px auto; width: fit-content;"> <p data-bbox="695 790 1205 841" style="text-align: center;">Pie chart showing means of transportation of 600 students</p>  <table border="1" data-bbox="646 873 1205 1312"> <caption>Data for Pie chart showing means of transportation of 600 students</caption> <thead> <tr> <th>Means of Transportation</th> <th>Number of Students</th> <th>Angle (degrees)</th> </tr> </thead> <tbody> <tr> <td>school bus</td> <td>150</td> <td>90°</td> </tr> <tr> <td>walk</td> <td>300</td> <td>180°</td> </tr> <tr> <td>cycle</td> <td>100</td> <td>60°</td> </tr> <tr> <td>car</td> <td>50</td> <td>30°</td> </tr> <tr> <td>(unlabeled)</td> <td>50</td> <td>30°</td> </tr> </tbody> </table> </div> <p data-bbox="411 1334 1247 1393"> <ul style="list-style-type: none"> • Use simple graphing software to enter data and create graphs • Generate different tables, pie charts and bar charts using ICT facilities </p>	Age Group	Number of Students	Angle (degrees)	12 year olds	10	120°	11 year olds	15	180°	10 year olds	5	60°	Means of Transportation	Number of Students	Angle (degrees)	school bus	150	90°	walk	300	180°	cycle	100	60°	car	50	30°	(unlabeled)	50	30°	
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Learning Outcomes		
<p style="text-align: center;">LO: 4</p> <p>Organize and display data using different forms of presentations</p>	<p>Suggested Learning Activities (DATA HANDLING)</p> <ul style="list-style-type: none"> • Arrange data in order from smallest to largest and speak of the: <ul style="list-style-type: none"> - largest score as the maximum score; - smallest score as the minimum score; - difference between the largest and smallest score as range; - the middle score as the median score as being the difference between the smallest; - For example in the set of data: 4, 4, 5, 6, 7, 7, 9, 9, 12 , - the maximum score is 12; the minimum is score is 4; the range is 8 (12 – 4); the median score is 7 • Determine the mode from: <ul style="list-style-type: none"> - a set of raw score as the score that occurs the most; - a frequency table as the score with the highest frequency; • Determine the median as the middle score when working with an odd number of scores; and as the sum of the two middle scores divided by two when working with an even number of scores. For example: the median of the set of scores; 4, 5, 7, 7, 9, 10, 10, 12 is obtained by adding the two middle scores 7 & 9 to get 16, then and dividing by 2 to get 8 • Calculate the mean of a set of ungrouped raw data (Give examples) 	<p>Assessment</p> <ul style="list-style-type: none"> • Identify the maximum, minimum and extreme values from a set of data • Arrange scores in order and state the median and modal scores • Compute the mean and the range from a set of data
<p style="text-align: center;">LO: 5</p> <p>Interpret data and draw conclusions</p>	<ul style="list-style-type: none"> • Ask questions that can be answered using the information in a table or graph • Answer questions based on information presented in tables, bar charts, line graphs, pie charts. • Draw inferences based on the information presented • Compare two sets of data by making reference to the mode or the median or the range of both sets of data 	<ul style="list-style-type: none"> • Respond orally and in writing to questions based on information presented in the form of tables, charts, graphs and pie charts • Make predictions based on information presented in tables, charts, graphs and pie charts

Learning Outcomes	Suggested Learning Activities (DATA HANDLING)	Assessment											
	<ul style="list-style-type: none"> Organize and present data in the form of bar charts. For example; <div data-bbox="585 321 1274 857" data-label="Figure"> <p style="text-align: center;">A bar chart showing the attendance record of a group of students</p> <table border="1"> <caption>Attendance Record Data</caption> <thead> <tr> <th>Day</th> <th>Number of Students in class</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>24</td> </tr> <tr> <td>2</td> <td>26</td> </tr> <tr> <td>3</td> <td>30</td> </tr> <tr> <td>4</td> <td>28</td> </tr> <tr> <td>5</td> <td>22</td> </tr> </tbody> </table> </div>	Day	Number of Students in class	1	24	2	26	3	30	4	28	5	22
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Learning Outcomes		
<p style="text-align: center;">LO: 6</p> <p>Probability Describe and compare the chance of a event occurance</p>	<p>Suggested Learning Activities (DATA HANDLING)</p> <ul style="list-style-type: none"> • Indicate on a number line between impossible and certain likelihood of something occurring. For example: -(A) it will rain on and overcast day • Use knowledge of equivalent fractions, decimals and percentages to assign numerical values to and speak of the likelihood of simple events occurring. For example; <ul style="list-style-type: none"> - there is a three in ten $\frac{3}{10}$, 30% , 0.3 chance of it raining today - there is an eighty percent (0.8, $\frac{8}{10}$) chance that our school football team will win the schools championship this year. • Solve sime probability problems. 	<p>Assessment</p> <ul style="list-style-type: none"> • Order events from least likely to occur to most likely • Determine the likelihood (probability) of an outcome